RECREATIONS

IN

AGRICULTURE, NATURAL-HISTORY,

ARTS,

AND

MISCELLANEOUS LITERATURE.

BY

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INTRODUCTION.

It having been found on many occasions inconvenient to adhere to a precise arrangement of the different parts of which this work consists, the Editor thought it neceſsary to close the work upon that plan at the end of the last volume, in order that such readers as should object to the deviation from his original plan, might have an opportunity of discontinuing it if they should so incline, without being under the neceſsity of having an imperfect work.

In this second series, which commences with the present Number, though the work will be the same in all eſsential particulars as before, and will of course be a continuation of the same performance, it is proposed to depart so far from the former plan as to adhere to no precise order of arrangement, but to give the different eſsays in the succeſsion that convenience may suggest at the time; it being still intended to give nearly the same proportion on the different subjects as heretofore, if not in the same number, in the same volume at least. The eſsays respecting agricul-

ture will become more practical and unconnected, so as to have very little of a systematic form. In natural-history, too, the eſsays will be more of a miscellaneous nature than in the former volumes, which it is hoped will prove more interesting to many readers.

In the preceding volumes the Editor, from an apprehension that the boldneſs of his manner of treating many subjects might prove disgustful, and fearing that he might be deemed a visionary if he proposed to effect things with ease that men had been accustomed to believe were so difficult as to be nearly impoſsible, was induced to proceed with a certain degree of caution, and, on this account, to postpone many discuſsions that he wished to bring forward; but having found that the public paid some attention to his proposal for heating houses, and constructing hot-houses with such a saving of fuel, and convenience in other respects, as no person he met with believed could be fully effected; and concerning which the persons he has engaged declared before any explanation of it was given to them, that if *half* of what he had promised only could be effected it would satisfy them entirely, and would be much more than ever they expected to see done: yet these very persons, after the principles have been explained to them, have declared themselves perfectly convinced, that not only *all* that had been promised, but a great deal more, may be fully effected by the simple means proposed; that they are not at present aware of any inconvenience that has been experienced in hot-houses, that cannot be thus obviated; and that the plants may be preserved at all

times in the hot-house with equal health as they can ever enjoy in the open air in the most genial climate. By these encouraging circumstances the Editor will be emboldened, in the succeeding volumes, to proceed with a freer swing than he has hitherto done, with a view to bring forward some particular improvements that he knows to be easy, but which the indolence of man has hitherto made him consider as arduous or impoſsible to accomplish. The *octal* system of arithmetic and metrical arrangement, slightly glanced at in the preceding Number of this work, is of this nature; but more peculiarly so is the system of writing by means of an universal character, which he means to develope in the succeeding pages, and which he has thus long postponed, merely from the hope that it may be now more adverted to than it would probably have been at an earlier period; for he is perfectly conscious that nothing but a want of attention to the subject can prevent it from being accounted such an obvious improvement, that every considerate mind which seriously examines it must see at once its infinite utilities, and the amazing facility with which it might be introduced into general practice. This is a thesis that I need have no hesitation to defend against all opposers: and it is now mentioned in this manner, in order to provoke some man of talents to undertake the task of refuting what is here stated; being well aware, that if I shall succeed in this particular, I shall thus probably obtain a coadjutor in the cause, who may be the means of effecting that which my own inferiority allows me no other prospect of being ever able to accomplish.

In one particular I have been disappointed in the preceding part of this work. I doubted not that some one would attempt to refute, seriously or ironically, many of the paradoxical positions, as they might easily be represented to be, that have occurred in it; yet none of these refutations, if they ever have been attempted, have come to my knowledge. I likewise entertained a faint hope, that in some instances these positions might have been corroborated, and their influence extended by additional observations by others. In both these respects I have misjudged. If the first has proceeded from a suspicion that I could not bear such opposition with temper, or a dread that it might produce a severe retaliation, I trust that experience would soon prove this to be a mistake. One who is in search of truth knows of no mode of so effectually aggrandizing a character as that of freely and unequivocally relinquishing an error as soon as it can be recognised; though an opinion cannot, from any other consideration but that conviction, be relinquished.

In the succeeding pages some attempts will probably be made to give such views of historical subjects as may tend to lead the mind into a train of making consistent decisions in that walk of literature. When the mind can be brought to grasp the whole of the circumstances that tend to operate in paving the way at a distance for effecting great changes in the situation of nations, history aſsumes an interest that it can in no other way be made to attain. I have been induced, from the present situation of things in this country, to attempt in a separate publication a slight sketch of a thing of this nature; but, to do the subject

justice, would require a minuteneſs of elucidation that I fear the temper of the times does not admit of. In the Recreations I must adopt subjects for illustration that are leſs connected with circumstances which, by awakening particular paſsions, may serve to warp the judgment.

It is likewise my intention to attempt a critique of the poems of Oſsian the son of Fingal, and of Rowley, as published by Chatterton; two important objects considered as matters of taste, which, by having incidentally aroused the feeling of certain irritable minds, have become the objects of malevolent controversy, instead of exciting the more placid sensations of genuine criticism. It is now time that this kind of murderous warfare should have an end; and I trust the public mind is now in some measure prepared to see the question agitated without any spirit of hostility, totally regardleſs of the parties who have been so warmly engaged on either side. Such, I hope, will be the spirit of that critique on which I mean to enter as soon as circumstances shall permit.

In hopes of being favoured with communications from my readers tending to correct mistakes—to rectify errors—to supply deficiencies, but above all to co-operate in the great object of rendering this work attractive to ingenuous minds, and efficacious in awakening new ideas that tend to enliven the imagination, to warm the heart, to discover error under the innumerable disguises that she affects to aſsume, and to exhibit truth with the fullest perspicuity that can be attained, I shall now proceed, and still go on till time shall arrest my hand in its progreſs. The last advice

that I shall give to those whom I leave behind will be, never to stop—still to preſs forward—farther—farther—

PLUS ULTRA.

N.B. *The recent high tax upon paper will necessarily frustrate the intention of the Editor to augment the quantity of each Number without any rise of price.*

On the Varieties of Plants.

HAVING had occasion to investigate, in the former part of this publication, the nature of that division of natural bodies which has been denominated *varieties*, in as far as they respect *animals*, with certain peculiarities that affect them, by attending to which the progreſs of the rural economist in his attempts at improvement may be greatly facilitated, I now proceed to direct the attention of the reader to the same claſs of objects respecting the *vegetable* kingdom; and doubt not of being able to show, that a proper attention to this department of science will unfold a still wider range of improvement, and of a more important kind, than that which respects the animal kingdom.

The analogy between plants and animals is so strong, that we find the same peculiarities affecting vegetables as we have already taken notice of respecting animals; that is to say, that the distinct varieties of each species of plants have a natural tendency to continue their kind by seeds; that they may, by art, be so managed, as to produce a mixed, or what may be termed a *mongrel* breed; and that also, without any intermixture

of varieties, a leſser variation is frequently produced from seeds, similar to those casual deviations of which we took notice among the same variety of animals; and that in many cases these casual deviations may be perpetuated among vegetables with a still greater degree of certainty than among animals. It is of much consequence, that these peculiarities should be distinctly marked, and duly adverted to; because it will be found, that the most eſsential improvements in agriculture and gardening depend very much upon the degree of our knowledge of these particulars.

But, although the general analogy between vegetables and animals may be distinctly traced in regard to these particulars, yet, owing to the much greater diversity that takes place in regard to the modes of propagating vegetables than animals, we meet with greater facilities, and on many occasions a still greater degree of certainty, in the mode of continuing an individual variety of plants than of animals, and on which depend many of those improvements that have been practised by mankind for time immemorial; although I am not certain whether the simple principle upon which they depend has ever till this moment been distinctly explained.

1st. I conceive it to be an universal law of nature, that every plant which is propagated from seed, like every animal proceeding from parents of any sort, is diversified from other individuals of the same species by some peculiarity, which might serve to identify it were we at the pains to mark it with a sufficient degree of accuracy, although, taking them in a general view, they obviously belong all to the same species,

This I should consider as a primary law, and as affecting all plants as well as animals, totally independent of those intermixtures with different varieties which we commonly call *mongrels.*

2nd. These individualities thus obtained, in particular among those kinds of plants which are the least liable to vary, have also a tendency to propagate their kind; though these still are liable to variations in a leſser degree, as before.

With a view to impreſs the mind of the reader with a distinct notion of my meaning, and at the same time to shew the utility that may result from an attention to these particulars, I shall adduce, as I go along, some practical illustrations of each head.

Every one knows, that the *varieties* of the different kinds of plants commonly cultivated in our fields and gardens are considerable, some of them differing very much from each other in several of their obvious peculiarities and very eſsential qualities; and that each of these produces, in general, its own kind with little variation. The farmer who sows pure red or white wheat, bearded or cone wheat, may rely upon reaping, in general, the kind that he sows. In the same manner, the farmer who sows pure black or pure white oats may depend upon reaping the same kind. So of two, or four, or six-rowed barley; and also of every variety of the different kinds of grain usually cultivated: and every intelligent farmer knows, that by adapting the particular variety to the soil, under the circumstances that affect it at the time, he may benefit himself very much, if his knowledge be sufficient: a striking example of which I gave with regard to oats

in one of the foregoing volumes of this work (Vol. II. page 11). This may serve as a general illustration of the first position assumed above.

But, though all the plants thus produced evidently belong to the same general variety that was sown, yet, on examining each plant individually, many striking diversities between them will be remarked. One will sometimes be met with which is more early in ripening, or more robust in its habit, or more prolific of seed, or plumper in the grain, or, in short, diversified from the general mass by some distinguishable peculiarity. The attentive cultivator then, by marking those individual plants,—separating them from the others when ripe, and sowing them by themselves, will obtain an improved breed (if I may be allowed the expression) of that variety of grain, which will be distinguishable from the parent stock by a superior degree of that quality for which it was selected. An example of the improvement that may be made by this kind of selection I also adduced on a former occasion; where I showed, that, by selecting a particular ear of wheat in this way, a farmer obtained a kind of wheat which, upon an average of crops after twelve years trial, yielded him at least four bushels per acre more than if the same ground had been sowed with the parent stock of wheat from which it was selected; and this wheat he was enabled to sell at from 20 to 30 *per cent.* above the usual price.

Another instance of a continued series of improvement, originating from the same cause, is mentioned by Dr. Priestley in a letter to the board of Agriculture (Communications to that board, Vol. I. page 363);

in which he states, that a Mr. Cooper, in Rhode island, had, by a degree of attention to this particular for a series of years, obtained vegetables of a variety of kinds far superior to any that could be elsewhere found in that country.

I beg leave also here to state, that there is a market gardener in the neighbourhood of Edinburgh, who, by an attention of the same kind continued for many years, has gradually improved his garden-stuffs till they have attained a decided superiority over those around him: his French beans in particular, the seed of which he takes care always to save from the most prolific plants only; by which means his crops have come to be decidedly more prolific than what he can obtain from any other seeds.

To put this case to a fair trial under my own eye: having observed last season a considerable diversity in the strength and prolificacy of certain individual plants of scarlet runners (kidney beans) when compared with others beside them, I saved a few seeds from each, which I mean to sow separately and observe the result. This is an experiment that many of my readers may easily repeat without either trouble or expence. It is not to be expected, that the plants will all have, in the same degree, the peculiarity which distinguished the parent stems: it is sufficient if a perceptible difference can be remarked. Nor ought even this, perhaps, to be looked for, unless it could be evidently perceived, that the weakness of one plant was not occasioned by any casual circumstance affecting the soil where it grew.

I beg leave farther to state, that having made a trial, many years ago, thus to obtain a sort of garden pease

as early as poſsible, I took care to mark those individuals which first showed bloſsom, so as carefully to preserve them for seed. This I practised with attention for three or four years, always selecting the earliest plants from among the earliest kind. By this method I obtained a sort that, under the same management, came a week at least earlier than the earliest sort I could buy. These I soon increased, so as to sow them in the open fields cultivated by the plough; and, under these circumstances, I gathered from the field, in the shire of Aberdeen (one of the northern counties of Scotland), a dish of pease one year upon the king's birth day (June 4th).

3d. A diversity of plants may also be obtained from the intermixture of breeds, as among animals, so as to produce a *mongrel* kind. Of this circumstance many agriculturists are aware; and to this we must attribute the deterioration of corn on many occasions when it is long sown upon the same soil, which induces the neceſsity for a change of seed (though the notions of men as to this particular are at the present time very incorrect). Hence, if white wheat be sown in a district where red wheat in general prevails, it will in proceſs of time become darker in colour, so as to approach to the nature of that which is peculiar to the district; there is, therefore, a neceſsity of renewing the seed; and so with other kinds of grain. Those having papilionaceous flowers, however, as beans and pease, are leſs liable to be thus affected than some other sorts of grain, because of the peculiar construction of their flower, which leaves the parts of fructification much leſs open than most others. Changes,

in regard to this particular, are also effected sometimes by accidental intermixture of grains of the different sorts in the barn, or otherwise, where the one sort increases faster than the other: but this produces a change of a different sort. It may be called an intermixture, rather than a mongrel debasement.

This kind of mongrel debasement is more liable to affect the plants belonging to the *brassica* clafs than most others; and this is more observable in those sorts that are strongly characterised by marked peculiarities than the others. Hence it happens, that if a few red cabbages be saved for seeds in a district where white cabbages are generally cultivated, they are found soon to degenerate, and become, at first, paler in the red of the leaves than the true sort; and, in two or three succefsions, they lose the red colour gradually, till they only discover discoloured veins on the thicker ribs. White cabbages reared for seed in Aberdeenshire, in the same manner, are gradually changed to red. This is very perceptible, and universally recognised there; but the vulgar notion is, that the climate is unfavourable to the production of white cabbages. After the same manner may it be frequently seen, that the kind of Marseilled-leafed *brassica*, usually called Savoys, are often blended with the common cabbage, and to afsume all the diversities that you desire: so that those who wish to have savoys with large white hearts, have only to save the seeds in the neighbourhood of some other cabbages, or with a plant or two of these among the seedlings: or, if they wish them to have open hearts, to mix them with any diversity they choose among the cole-tribe. The effects of such intermixtures are as certain as those of animals.

Turnips are as susceptible of this mongrel debasement as cabbages; this I once ascertained by a decisive experiment. The yellow turnip differs from all other sorts, by being yellow (not only on the crown of the root, but) through its whole substance. It is a remarkably sweet turnip, and firmer than the other sorts; but does not grow to such a size as the green-topped sort. Finding it rather firm for the cattle to bite, and wishing to raise the size, I thought it would be desirable to have a mongrel sort between the green-topped and the yellow. With that intention I planted some of the green-topped sort around the edges of a small patch of yellow turnips for seed. After the flower was over, the green were taken away. The result was precisely what I wanted: the plants produced from these seeds were internally of a pale yellow colour, with a greenish tinge on the top of the root; and of a larger size and softer texture than the true yellow turnip. This kind I propagated for upwards of twenty years; and found that the seeds did not at all degenerate, when they were saved with due care. The *ruta baga*, or Swedish turnip, was not at that time known in this country. Since that plant has been introduced I had never thought of trying the effect of a mongrel breed between it and some of the other sorts; but shall do so this season, if I live. Should it retain the quality (which it alone poſseſses of all the turnip tribe) of admitting of being transplanted with ease, and retaining its succulence of root after it advances to seed, it will be a valuable acquisition; for, were a mongrel breed to be obtained between it and the green, it would be much improved in point of size. I recom-

mend this experiment, therefore, to some of my agricultural readers.

In all the above named particulars the analogy between plants and animals is very obvious; but in those which follow, the peculiarities affect the vegetable kingdom only.

As plants admit of being propagated in many other ways than by seeds, we are thus enabled (except only among the clafs of annuals) to perpetuate an individual diversity with much greater certainty than can be done among animals; for, wherever a plant can be propagated by cuttings, by layers, by offsets from the roots, by grafting or budding, or by any other means than seeds, the individual variety may, for aught that I know, be continued for any length of time, without any sort of change whatever. I am aware that an ingenious gentleman, for whose general knowledge I bear a high degree of respect, has lately proposed an hypothesis, which implies, that trees which are propagated by grafting suffer a gradual deterioriation, by which they infallibly become diseased and die outright in a given time. I do not choose to enter into an investigation of this hypothesis at the present time; but I may briefly say, that the facts adduced in support of this hypothesis seem by no means to he established so firmly as to bring conviction to my mind, or to counterbalance the many others that lead to an opposite conclusion. Numerous opinions, by far more vague than the above, are afloat respecting the degenerating of potatoes, and many other plants, which I consider as unfounded, and which I shall perhaps examine on a future occasion: I mention them now,

merely to show that they are not overlooked. But if these variations should even be admitted, they may be considered as exceptions only to a rule which, after all, must be allowed to be very general; viz. that a particular variety of plants can be continued without change for any length of time, if it can be otherwise propagated than by seeds.

It is to this circumstance that man is indebted for all the benefits which he has derived from the engrafting and budding of fruit-trees. All the varieties of apples, pears, cherries, plums, peaches, apricots, nectarines, and various other kinds of fruit trees, owe their origin to the diversities that have sprung from seeds, and that have been marked as good after they have come to produce fruit. It is now perfectly understood by every gardener, respecting these varieties of any one kind of fruit, that, though they be distinguishable from each other by an infinity of particulars, not only respecting their general prolificacy, the size, form, shape, consistence, and flavour of the fruit, and the time of the year that it attains maturity; but also respecting the manner of the growth of the tree; the thickness and proportions of its twigs; their manner of shooting forth from the parent stems; their tendency to particular diseases, or general or partial decay; the size, form, colour, and consistence of the leaf, and many other particulars, by which every individual kind can be easily identified; yet if the whole of them could be engrafted upon one and the same stock, each kind would retain its diversities from all the others with the most undeviating certainty, and may be thus propagated, by cions being inserted into young stocks, *ad infinitum*.

In like manner, those kinds which admit of being propagated by layers or cuttings, as the vine, the fig, gooseberry, currant, and some others, if thus propagated, are never found to deviate from the parent stock. So of those which spread by runners, as the strawberry; or increase by suckers, as the raspberry. All alike verify the rule, that varieties can only be obtained from seeds.

When we contemplate this economy of nature, it is impoſsible to avoid recognising the power that is thus conferred upon man to benefit himself by it, if he chooses to make a proper use of those faculties which have been conferred upon him. He has been endowed with reason to mark those facts which present themselves to his notice, and to draw from them the conclusions to which a comparison of those facts neceſsarily conduces. But, before he can avail himself of these benefits, he must exercise his faculties: yet it is to be lamented, that his views are too often confined to individual objects, which he regards as being in a great measure unconnected with others; so that the consequences which result from their various influences upon and relations to each other are not attended to. Every man knows, that varieties of certain plants are obtained from seeds; yet how few have extended their views so far, as ever once to inquire whether this applies to every plant, or not? Few persons are so little informed as not to know, that a wilding apple from seed cannot be depended upon for producing a good kind of fruit; yet few have given themselves the trouble to consider, that all the kinds of apples that are cultivated in our nurseries by budding and engrafting

have been originally wildings that have been selected from among the endleſs varieties which are thus produced, and propagated with care because of the valuable qualities which they were observed to poſſeſs. Some men have even adverted to this last circumstance; yet among these how few are there who draw the obvious inference from this fact; viz. that by a careful attention to a number of wildings, continued for a sufficient length of time, other varieties still may be discovered, that may poſſeſs qualities far superior to any hitherto known. The golden pippin is justly esteemed a very valuable fruit; but the tree which produces it is weakly, and subject to canker. The fruit itself loses its sharpneſs in a few months, and then becomes insipid. Could an apple (having the same delicate flavour) be found that would retain its sharpneſs till June, Who will not say that it would be a valuable acquisition? But if the wood of that tree were as healthy as some others; if it were as generally productive as the nonsuch; if it were of as large a size as the codling; if it continued in a good eating state from October to June; and if in shape and beauty it were as perfect as can be desired; would it not be accounted an acquisition of still greater value? And who will pretend to say that this is impoſsible? No thinking person dare say so.

But if we have not drawn this first and most obvious conclusion; and if, in consequence of that inadvertence, we have neglected to make experiments and investigations with that view, we cannot expect that any progreſs should have been made to ascertain what are the most probable measures to be adopted for the

purpose of making our experiment succeed to our wish. Has it ever been ascertained by accurate trial, whether the seeds of a particular kind of fruit have a greater tendency to produce fruit approaching to the parent sort than others? I know of none such. From analogy with animals under similar circumstances, we may conjecture that the probability is so; but here we must stop. Has it ever been ascertained, that the seeds from a solitary tree (or those from a grove of the same kind of grafted trees) has a greater tendency to produce descendants resembling the parent, than the seeds of the same fruit when surrounded by other varieties of the same kind of fruit? I have never heard of an attempt to ascertain this fact: yet it is very obvious, that, were these facts ascertained, it would wonderfully facilitate our attempts at improvement, and might give a sort of certainty to our efforts. Has it ever been ascertained, that distinct varieties of the same kinds of fruit may be blended together so as to produce a mixed breed like mongrels among animals, and those mongrels among the *brassica* tribe of vegetables above enumerated? I know not. One fact alone that I can recollect seems to give a sort of probability that it may be so. There are three varieties of currants *(ribes Rubra)* that are very clearly distinguishable from each other; the black, the red, and the white; each of which have several lefser varieties: but I know not whether a mongrel breed can be produced between the black and either of the other two by propagating them from seeds that have been produced upon trees surrounded by other sorts. That a mongrel sort has thus been produced between the red and the white seems

to be very probable, forming that variety which is known by the name of the Champaign currant, which has only a faint tinge of red blended through the white. Experiments of this nature seem to be so obvious, that one would suppose they must have been so often made as to ascertain these facts without a posſibility of doubt; yet I think there is great reason to suspect that it never has been done. Of late, so many experiments have been made in Lancashire about raising new sorts of gooseberries from seeds, that I conceive it to be impoſsible but that some of these experimentors should have adverted to one or more of the circumstances above stated, and of course remarked the general effects of these circumstances. Should this paper fall into the hands of any one who has made remarks of this tendency, it would be a favour done to the public, as it would tend to extend the sphere of general knowledge, if they would have the goodneſs to communicate their observations through the channel of this work, or by any other means that they shall deem more eligible.

I have chosen to make these remarks upon fruit trees most usually cultivated, because mankind will be disposed to pay more attention to them than to others; yet on comparing the facts that are known respecting fruit trees, and extending these observations to other trees, it seems to me by no means improbable, that many trees which have never been accounted worthy of cultivation might, by an attention of this sort, and propagating the best kinds by engrafting, become a source of very great improvement, by augmenting the food for man and beast far beyond its present limits. If we had contented ourselves with observing the small

crab apples, those called Siberian crabs of various sorts, all of them very small, we should have formed no adequate notion that an apple could ever be found that should approach to the size of a child's head: yet such an apple is described by Dr. Thaer of Hanover in the first volume of the Communications to the Board of Agriculture; and we have all seen apples of a size that must be deemed monstrous when compared with those crabs. Cherries that have been reared from seeds are for the most part so small, and contain so little pulp, that a man who had never been accustomed to attend to the cultivated sorts would scarcely have suspected that a kind so large and so fleshy (when compared with the size of the stone) could ever have been found as the Harrison's-heart, by others called the Turkey Begaroo cherry. Those who have been accustomed to observe the common sloe, or bullace tree, would scarcely expect a variety of that fruit so large as the magnum bonum plum, far less of the size of the nectarine and peach! A man might have been long acquainted with the hawthorn, without suspecting that a variety of it could be found to yield such a fruit as the medlar. These afford striking examples of the improvements that have been made in the produce of our gardens by a long continued attention to the cultivation of these classes of plants; and they appear to us in no respect striking, because we have been long familiarised with them. But let it be supposed that we were only acquainted with wildings of these kinds of plants, and that the art of engrafting had never been applied to them, and we shall see at one glance, that these kinds of fruit trees would have been accounted of much in-

ferior value to many others that have been hitherto so neglected by us, that we have never thought of cultivating the best kinds of them by means of engrafting.

Of all the sorts of fruit known on this globe, none are so well adapted to afford a solid nutritious food to man as those of the farinaceous kind. The fleshy fruits are pleasing to the palate, and refreshing; but, unleſs they are conjoined with farinaceous matter of one sort or other, they prove insufficient to sustain human life. Dates, almonds, walnuts, on the contrary, afford a substantial and nutritive food, and the trees grow readily in situations where human culture is impoſsible to be applied, or unneceſsary. This claſs of fruits, then, ought to have attracted the first and most marked attention of man, and should have obtained from him the most careful degree of culture, in as far as respects engrafting and the melioration of its fruit: yet in Britain, and I believe all other northern nations, this has been entirely neglected: we have propagated wildings alone, and therefore we consider them as forest trees only, fit to be cultivated for the sake of timber, but not for fruit; yet the chesnut in particular, were the best sorts to be propagated by engrafting, might be made to afford an immense proportion of the most nutritive food for man. I have not the smallest doubt, that were the fruit of the chesnut as much improved by selecting the best sorts and propagating them by engrafting, and had that been continued for as long a period of time as has taken place with regard to the other fruit-trees above mentioned, we might have been able to draw from an acre of mountainous land that is

unfit for producing any crop of grain, properly planted with chesnuts, a much greater quantity of human sustenance than can be derived from it by any other means yet attempted by man. What greatly adds to the free produce in this case is, that no seed is to be deducted from the crop, nor does any expence of cultivation tend to enhance the price. These are such obvious reflections, that I am almost ashamed to add, that this species of improvement seems never yet to have been once attempted by any person that I have heard of in this island. I do not expect that it will now be attended to, although the situation of the country so obviously requires it; no, not so much as to make it even obtain a serious investigation.

The beech-tree also, as I had occasion lately to show (Vol. II. page 388) might, by the same means, be made a source of great plenty of food for beasts at least, if not for men, and the walnut might then be cultivated with profit. But many of my readers will think that I have dwelt long enough on this article. I therefore desist; for, however desirous I may be of suggesting obvious improvements, I shall never attempt to force them upon any one who is not disposed to admit their utility.

ON HOBBY-HORSES.

To the Editor of Recreations in Agriculture, &c.

SIR,

It is among the chief advantages arising from a publication like yours, that we have an opportunity, through its medium, to addreſs individuals of

high rank, or public bodies, neither of which parties may always be in the humour of attending to private communications. In this light our periodical works, whether magazines, or newspapers, are highly useful. They afford a means of conveyance more certain than that of the penny-post; and undoubtedly more certain than the ancient practice of slipping a letter and a shilling into the hands of a great man's porter. We have, by the medium of such publications as yours, an infallible proof that our letter has been read by *somebody*, and that, by means of somebody, it will certainly reach the eye or ear of the person it is intended for. And as the writing of letters to public men and public bodies for the public good is a duty incumbent upon us, so we hereby call to witneſs the public at large that we have performed the said duty, and that if it loses its effect the fault is not to be imputed to us.

With your permiſsion, therefore, I have taken the liberty to addreſs what follows to the members of the Veterinary college, a body of men lately incorporated for the wise and humane purpose of redeeming farriery from the hands of quackery and ignorance, and alleviating the diseases and prolonging the lives and comforts of the most useful animal that the earth bears; an animal, nevertheleſs, doomed to be alternately the prey of ignorance or cruelty. The advantages which have already been reaped from the institution of the Veterinary college are, I am credibly informed, great enough to bespeak its present merit, and give hopes of its future more extensive usefulneſs.

But while I pay this just tribute to its excellence, I

wish at the same time to throw out some hints which may tend to enlarge the sphere of its utility; and to inform the medical gentlemen, that, while they have attained great proficiency in the knowledge and cure of the Arabian horse, the racer, the hunter, the black horse, the old English roadster, the poney, and the common carter, it will be no lefs incumbent on them to study the diseases and dispositions of that other species known by the name of the *hobby-horse*; which is so very numerous in this country, as well to deserve the attention of the learned gentlemen to whom I appeal. I shall, therefore, offer a few remarks on this animal, not in a systematic form, for I pretend not to be a naturalist, but rather with a view to excite others to study the breed of an animal so common, and often so troublesome.

The *hobby-horse*, if I am not mistaken, is entirely of English breed; and, at whatever time it may have first appeared, I do not recollect any mention of it of older date than about a century. There are several circumstances which ascertain *à priori* that these are facts; the first is, that the hobby-horse cannot exist in any perfection unlefs in a free country. Why this should be so, I shall not stop to inquire; perhaps it may appear hereafter on difsection. Now, sir, we must allow that England is the oldest free country in the world: and secondly, they are not to be traced much above a century back; because, until the glorious revolution of 1688, this could not in strict language be called a free country, and ever since hobby-horses have increased so in number that almost every body rides one. For these reasons, I presume that I

have attained some certainty as to the country and age of this breed of horses.

With respect to their properties, they are various, as in other horses; some resemble the wild and untameable Arabian; some are qualified for the road only; some for the saddle; some are dull, but carry well; others are skittish, and very unsafe in *cross* paths. In general they are but ill tempered, which I attribute in a great measure to the absurd manner in which they are treated, and the ignorance of their riders. I have just been at a private *menage* in my neighbourhood, where a man has been riding his hobby-horse, named *democracy*, for two hours, kicking and plunging and bespattering all about him, without deriving any benefit to himself, or imparting to us the least instruction. What is the reason? The rider is a poor weak fellow, who has not above two or three ideas in his head, which he has been repeating for the last ten years, without borrowing the least afsistance from argument or experience. What is he but *a man who rides his hobby-horse without feeding him?*

There is another in my eye, in very advanced age, who is perpetually repeating to us the stories of his youthful gallantries, and not only boasting what he has done (for which, if true, he ought to have been hanged long ago), but what he can yet do; who stuns the ear of the sociable and the decent with impudent expreſsions and allusions; who loves to put modesty to the blush, and of whom may be said, as of Polonius, "give him a jigg, or a tale of bawdry, or he sleeps!" What is such a character but a man riding his old hobby-horse, *a broken winded gelding?*

MUNCHAUSEN is a gentleman who has travelled a good deal, and thinks he may claim the usual privilege of certain travellers, an exemption from the strictneſs of veracity: who repeats the same marvellous story over and over, and yet, from want of fidelity to the original composition, varies it so much, that those who remember it at first hand can scarcely recognize its principal features: who minds no event near him, but as fit to be compared with something that he met in such a county; and who will never be at a loſs for proof, only because the bills he draws upon imagination are duly honoured. What is this man's hobby but a *post-horse most unmercifully jaded* by riding on a *road* that has no *solid bottom?*

There are likewise a species of *war-horses* among the hobbies. This breed has very much increased within the last eight years, and are particularly unmanageable, as they have been *crossed* with a spurious beast from France. They affect to be fit to draw in a coach, but upon *trial* they have much oftener been condemned to a *cart*. Some of them were got by the stallion I mentioned above, *democracy*, whose dam was *revolution*, the sire *rebellion*, got by *mismanagement*, out of an American racer, *congress*, but much degenerated in this pedigree.

And this, by the way, brings me to mention another species of the hobby, commonly called the *genealogists*. Those who ride them are very stately in their pace, and hold up their heads well; they are perpetually appealing to the honour and renown of their grandsires and great grandsires, whether ministers of church or state, whether great warriors or peaceable aldermen:

they look down upon every one that claims merit on his own account, and cannot produce a somebody, who lived some time ago, and did something wonderful, from whom they are somehow or other descended. This description of hobbies, notwithstanding the stateliness and slowness of their pace, must be classed with *bits of blood.*

Were I to go through the whole of the species of hobby-horses, I should take up too much of your Recreations; and it is the less necessary, because those I have already mentioned are sufficient to prove how requisite it is to investigate the true nature of their diseases and dispositions, and recommend them as proper objects for the Veterinary college.

I have no manner of doubt that they may be very useful animals, provided they can be trained to go quietly, and not kick and plunge in such a manner as to endanger people who are going peaceably about their business. The ignorance of their riders is, as I have observed, the principal cause of the present falling off in this breed: but if that ignorance can be corrected in any way, surely our time would not be misspent; and I have no doubt that much may be done by a proper attention to *bitt* and *bridle*; and, perhaps, by obliging their owners to ride without stirrups, a thing which no specimen of this breed, that ever I saw, can bear for a moment. Indeed, the least touch of a cane, from the hand of a bye-stander, will often set them a galloping, capering, and curvetting in a most surprising manner. It is no uncommon thing for a rider to be flung on such occasions. It was but the other day that a friend of mine mounted his hobby,

in company with a great many others, when the animal got a touch from some one present, and set off at a most furious rate, bearing down all before him, and riding over all the inclosures of decency and veracity, and at length flinging his rider, who, on his recovery, found himself alone, and deserted by every one of his companions.

It is this mismanagement that undoubtedly renders the breed so disagreeable. The expence in keeping would not be so great, if a little prudence was observed in choosing the proper time for a ride; but what can we expect of beasts who are never properly fed, nor broken in so as to be safe? And still lefs can we expect any advantage from the foolish trick of riding two or three horses at a time. However, I am hopeful that the hints I have now thrown out will be attended to, and that hereafter we may improve the art so much, that *hobby-horsemanship* may be safe, gentle, and pleasant, and that we may be in no danger from lameneſs, broken wind, foundering, or the staggers. I am, sir, your humble servant,

EQUI-LIBRIUM.

OBSERVATIONS ON SOME INSECTS ON ROSE BUSHES.

To Dr. Anderson, &c.

SIR, Jan. 19, 1801.

On cutting over my rose bushes a few days ago, I was struck with the appearance of something like a dead leaf sticking to a stem which I did not intend to cut out. On examination, by slitting it

open, I discovered that it contained a very small chrysalis; and, on further search, I found my rose-trees pretty plentifully supplied with these dormant insects, firmly fixed to the stems of the trees from the top to the bottom, so low as within an inch of the ground; generally only one, sometimes two, and rarely three on a stem. The number I have picked off may be about forty, from as many trees, of the common red and Dutch 100-leaved kinds, and a few from sweet-briar. I have several other sorts of rose-trees, but could not find this chrysalis on any of them (see paper, number 1).

Another chrysalis (in paper number 2) I could find but few of. They all adhered to the stem exactly in similar situations.

Number 3 contains six dormant insects, which adhered to the top of the sprig enclosed in the same paper. I could discover only two specimens.

In the paper number 4 you will, by looking with some attention behind the buds on the enclosed sprigs, discover a small black insect. May not these be those which are so ready to enter the rose-bud when it first appears? I could find none of these on the lower parts of the stems. In page 136 of your second volume, some notice is taken of the insects which infest roses, but in a manner which indicates that your correspondent knew nothing of their natural-history; and, as you have made no comment upon his observations, I have taken the liberty of sending you the four specimens abovementioned, with the hope that you will favour us with some account of their natural-history in your future Numbers, if it be well ascertained; or if

not, that you will have the goodneſs to describe these insects as they appear in the present month, in order that some of your readers, *who have opportunities*, may be induced to watch their progreſs the ensuing spring. The insects in number 2, 3, and 4, are all from the common red rose.

I cannot omit taking this opportunity of expreſsing my regret that your future Numbers are likely to be very bare of engravings, as they are not only highly ornamental, but extremely useful, and explain at one view more than many pages. I thank you for your kind attention to my last; and, wishing you good succeſs with the continuation of your publication, I remain, sir, your very humble servant, H. G. H.

P.S. A friend last year planted the potatoes *in his garden* entirely from sprouts taken from the roots in the barn where they lay. The potatoes he consumed either in his house or cattle. The produce was about 2½lb. per root. The whole quantity produced in the garden about ¾ths of a ton.

Having shown the above to a friend, on whose judgment in cases of this sort I place much greater reliance than on my own, he returned the following answer. "I have carefully examined the papers number 1, 2, 3, 4, but have very little to say upon them. Upon the twig enclosed in number 1 is the case of the *larva*, or perhaps *nympha*, of a small tinea of the same family as those who live on woollen cloth, and form cases from such substances as they can meet with; but this family is so numerous, that it is impoſsible to say of what particular species it may be. In

number 2, 3, and 4, I cannot discover any insect or part of an insect, either upon the twigs, or loose in the paper, and therefore can say nothing of them."—I shall only add, that my observations very much concur with the above, only that I can perceive on number 2 and 3 some marks that I should have taken to be specks in the bark, of a vegetable, not an animal nature; but should they prove to be animals at all, they must belong to the coccus clafs still in their flatted state. The small twigs were so soon dried as to render it impofsible to examine them with accuracy. I saw no vestige of the small insect number 4. It is only by continuing to mark the progrefs on the live twigs, that things of this nature can be investigated.

Though I have reason to suspect that the insect alluded to in page 136, Vol. II. cannot be with so much certainty destroyed by the procefs there mentioned as is there expreſsed, I am far from concurring in the unqualified reprehension of it above given, and refer this matter to be reconsidered by this correspondent.

N. B. *It is not my intention to omit any neceſsary illustration by figures in future, though I shall probably be obliged to have recourse to copper-plâtes for that purpose. Some of my readers will poſsibly deem this an improvement. For the sake of others, however, I shall still have recourse to wood cuts occasionally.*

As real incidents, in general, convey a much more satisfactory idea of the actual state of things than any fictitious representation can do, the following letters are submitted to the inspection of my readers, as they relate to a circumstance that much occupies the public mind at the present moment. The facts therein stated lead to very important conclusions,

on which, however, I shall not make at this time any further remarks.

To Doctor Anderson, Isleworth.

SIR, February 2, 1801.

SOME time ago, upon application to you with respect to Mr. J———'s farms in Wales, you were so good as to mention and recommend me to apply to Mr. B—— at Edinburgh, to inquire if any of the farms belonging to Sir T——— V——— were to let near to T——— in Yorkshire; which I did, but found there was none of his land then open. Since that time I have been with Mr. J——— in Wales, and looked at some of his farms; but have never been able to agree, owing to other persons having claims upon the sheep walks belonging to them; and also to the tythes, which are greatly against improvements. You must be sensible how disagreeable it must be to have another person come and reap the produce of your industry and money without any expence or trouble on his part! I have this last summer been into Devonshire, by the desire of a Mr. C——— of A——— to take some of his farms there, and understood, from the general tenor of his letter, that I was to be freed of tythes and taxes; but when I came to enter into particular stipulations as to rent, &c. I found that I had misunderstood his intentions in this respect: so that, after having gone so far at so great an expence, I was forced to return as I came. But, if I am not mistaken, there are many places in England, and in Wales also, where improvements might be made with great advantage both to landlord and tenant in the first

place, and in the end to the public. How many large tracts of ground, very fit for improvement, are dispersed over the country, that are at present doing nothing but keeping in a starving condition a parcel of poor small lean sheep, crawling over a bare dry soil the whole season at 6d a head; which, if it were limed and properly cultivated, would produce both good corn and grafs? I should like to have taken one of Mr. J——'s farms; but the expence of lime is too great, owing to the badneſs of the roads, and to the way it is brought by sea. I do believe that there is not a shipmaster in Wales, who would go to sea with a cargo of *burnt* lime on board, as they do in Scotland, which would save a great expence.

I have taken the liberty of writing to you at this time, to see if you know of any gentleman that has farms to let, and who wants an improving tenant, that can be recommended by the best judges in the country,—has occupied land upwards of thirty years, and, upon getting encouragement, would go to any part of the country; I can lay out from 1200l. to 1500l. upon a farm, or am willing to undertake the improving at the landlord's expence and for his benefit; or, if the undertaking be great, I have no objection to join. J—— F—— wrote me from Wales, that lord C—— wanted a person of my description on his estate in Pembrokeshire; and, if I recollect right, the gentleman who spoke to him about it was the Honourable Mr. G——, or some such name; but as F——, I understand, has not behaved well, and I believe has left Wales, I can have no communication with him. If, however, you are acquainted with his lordship, or

his man of busineſs, and if I do not presume too much upon your goodneſs, it would be a particular favour if you could inform me whether such a person is wanted by him. Upon my knowing it, I would write immediately. Dry level soil, good climate, near lime and markets, are the objects most to be desired; and, with regard to servants, I must bring them with me; at least a part.

I am sensible that many apologies are neceſsary on my part for the liberty taken with a person whom I never saw; but blame the world for publishing, and me for believing, that Doctor Anderson will not refuse a little of his aſsistance to put it in the power of a man to provide for a wife and eight children, and who wants nothing but a situation to use his abilities and property. I am, sir, your most humble servant,

R——. S——.

The Answer.

SIR, Isleworth, Feb. 28, 1801.

I RECEIVED yours of the 2nd instant only this day, and lose not a moment in answering it, lest you might think me neglectful of you, although I probably cannot say any thing that will prove satisfactory to you.

I have not the honour of being acquainted with the nobleman you mention, so that I cannot be of any service to you in regard to that particular.

When a person who is acquainted with the practice of agriculture travels through England, he is, no doubt, astonished to see so much waste ground, and so many tracts of fine land neglected and mismanaged.

Nature has done much for this country, but political institutions have totally frustrated her intentions in many respects; nor do I see the smallest prospect of its ever being otherwise. From these considerations I am decidedly of opinion, that Scotland, with all its defects, is a much better country for a corn farmer than England.

The tythes, wherever they prevail, I consider as a perfect bar to every attempt at spirited culture; so that I should never advise a person who had that in view, *on any account*, to take a farm that is not tythe free. Such a thing, indeed, can sometimes be found here; so that this bar is not absolute.

But there is another and a still more indefinite burden, that cannot in any case be removed; I mean *the poor rates*. This is an evil which strikes at the farmer in two ways. First, it augments his rent at a rate to which no limits can be assigned. In most parts of England, if the poor's rate was five shillings in the pound last year, it will be nine or ten this year; and no one can say but it may be fifteen in the next. A member of the house of commons this week mentioned a parish in which the rates are twenty-five shillings in the pound; that is to say, if the rent that the tenant pays to his landlord be twenty shillings, he must pay over that rent twenty-five shillings to the poor; nor does he know how high it may rise afterwards. This is paid entirely by the tenant, without any deduction from his rent. A second evil attending this, and which is a necessary consequence of it, is the want of good servants; for, instead of relying on their industrious exertions while in health and vigour for procuring a

subsistence in old age, by saving a little, and by their good conduct insuring the kindness of their superiors, as in Scotland; they expend, while in their prime, their whole earnings with a wasteful indifference, relying upon the parish for support in every casual distress; and a miserable support it is; so that the wives and children are often seen in the most tattered condition, living in filth and idleness, and too often pilfering small articles that come in their way; while they would be affronted at being desired to go out and earn a day's hire by cutting down corn or other rural labours. Hence it becomes totally impossible for the farmer to get his most necessary operations forwarded with a reasonable economy; he feels himself obliged to have recourse to the scythe instead of the sickle; and by this wasteful practice loses more than would often be a good rent for the land; while the average produce is thus diminished to the people at large in the degree of more than one-fourth part of the total consumption of the country. From the same cause, many other of the most necessary operations must be abandoned, on account of the intolerable expence that accompanies them. Hence the general prevalence of those slovenly practices which you have beheld. I saw a gentleman this very year go into his barn, and with a few strokes of a switch beat out from the straw a handful of wheat; yet he scarcely dared venture to reprehend the men for their negligence. When I advised him to get a threshing machine, he said he dared not venture to do so, lest they should set fire to his premises. I then advised him to have one for threshing the straw; and sure I am, that if any person were to get such a ma-

chine, and pafs through it all the straw that comes to the London hay market (could he be permitted by law to do so) he would soon be the richest man in England, and would be able to bring more corn to market than any ten farmers in the kingdom.

Should you attempt to bring servants with you, difficulties present themselves that you are not, perhaps, aware of. They would pofsibly not be permitted to make a *settlement* in the parish, lest they should become a burden upon it; and if they were permitted to settle, they would soon get connected with, and corrupted by the examples around them, and so become unmanageable like the rest.

Added to these obstructions, you will find among men of property a general disinclination to grant leases of a reasonable length; or a practice prevailing in the country, even without special stipulations, to establish certain restraints that tie up the hands of the farmer from using proper exertions, or that expose him to unexpected molestations; and, to crown the whole, the system of taxation that Mr. Pitt has lately adopted respecting this clafs of men (and which there is every reason to believe he means to proceed upon to greater lengths), gives such a prospect of endlefs, indefinite, and vexatious burdens to them, as must, I think, deter every man of common sense from engaging in that bufinefs, while others remain for him to choose, in which he is more effectually protected from such innumerable difficulties.

From these considerations I am clearly of opinion, that if you mean to prosecute the bufinefs of a *corn* farmer, you will have a better prospect of succeeding

in Scotland than in England. But if, at all events, you wish to try this country in that capacity, it would be more advisable to come to London (which you might do by sea from Berwick at a small expence), and there advertise for a farm, describing such as you want (particularly to be tythe-free, as a *sine qua non)*; and then you could go to look at such as you thought had the best chance of suiting you. I should take pleasure in lending you every assistance in my power; though I confess the circumstances respecting the *person you mention* will render me less sanguine in my expectations than I might have been.

Wishing you success in your industrious exertions, I am, sir, your most humble servant,

(Signed) JAMES ANDERSON.

To the Editor of Recreations, &c.

"I was naked, and they clothed me; hungry, and they gave me food; a stranger, and they took me in."

SIR, Albemarle Street, Nov. 10, 1800.

I SEND you an anecdote, or narration, imparted to me by a friend while on a late visit to a secluded part of the country, which is not the less curious from being true; and if you do me the honour to deem it acceptable, it is very much at your service.

In one of our rides we were met by a very well dressed and genteel looking man, whose horse, I may with safety say, was worth both our's put together, if not those of our servants into the bargain; he accosted my friend quite in the style of an independent free-

holder, and without betraying any exertion refused to partake of a good dinner.

"This gentleman," said my entertainer, "you "must know, is of the law, and but a few years back "was a striking emblem of the simplicity and good "fellowship of this neighbourhood. He roosted in our "little village on speculation with all the avidity of a "monopoliser; but his sanguine hopes stood long in "a very doubtful and tottering condition; and without "being enabled by the assistance of his education to "discover, that to gain a great deal it is frequently "necessary to sacrifice a little (sacrifices being ex-"cluded from the tenets of his profession), he was on "the eve of bidding us adieu in poverty, disgust, and "disappointment; when suddenly a friend, in the garb "of a competitor, appeared in time to spare an effu-"sion of parting tears. He was now prevailed on to "postpone his departure *to spend a few holidays* "*with his brother stranger*; this brother opened his "eyes; his teeth now, instead of the *pores* of his gar-"ment, were exposed to public view. The snarling "friends throve; the fat of our land with mutual ran-"cour they threw at each other, and mutually fed and "fattened. From among our virgins they chose wives; "nor were they then satisfied. Some of us still claimed "precedence at our public meetings; at one of which "a third brother appeared, to whose palate our food "proved grateful, and whose person our raiment be-"came; who moreover, being pleased with the sim-"plicity of rustic manners, has never since left us, "but resideth here to this day.

"This addition," continued he, "has been to us

"a serious and decisive acquisition; our ancient and "hereditary privileges we now discover to be usur- "pations and abuses; we find that we were deceived "in our friendships, betrayed by our want of caution, "and patient, through ignorance and tameneſs of spi- "rit, to the impoſitions of our neighbours; and as "time has proved to our conviction, that we should "have discovered none of our evils without the friendly "aſsistance of these *settlers*, we can do no leſs than "acknowledge them umpires in our many cases of "difficulty." I am, with sentiments of respect, sir, your constant reader, ANTI-ATTORNICUS.

Thoughts on Historical Composition.

NEXT to the pleasure that results from the gradual evolution of mathematical truths, perhaps no exercise of the faculties affords a more agreeable recreation to the human mind than the developement of historical facts by a person who is endowed with talents and taste sufficient for that arduous enterprise. But, of all the enterprises that I know, this is perhaps the most difficult for man to accomplish: no wonder then, that many unsucceſsful attempts should have been made in that line. It is but a small part of the human species that have even given themselves the trouble to form an adequate notion of what a history ought to be; and among those who have formed the most accurate ideas on that head, the difficulties have probably at all times appeared to be so great as to deter them from attempting the task; and thus it has fallen into inferior hands, who, feeling no difficulties, have

advanced without fear to fill up the literary gap that has thus been left open for them.

All mankind have discovered a wish to have some knowledge of the events that have preceded them in this world; and, as this could only be preserved by memory before the art of writing was discovered, it gave rise to many fabulous accounts, which were varied by each narrator so as to suit his fancy. This naturally gave rise to poetical legends, which, at the same time that they exaggerated the fable, gave to it, on account of the measure of the verse, a kind of stability which it could not otherwise have acquired. After the art of writing was discovered, and on the revival of letters in Europe especially, an attempt was made to preserve the memory of past events by that means, which gave rise to many prose legends collected from traditionary stories, which, though equally fictitious with the former, assumed more the appearance of an ordinary narration. The defects of this kind of unauthenticated narration, containing many improbable circumstances, having been generally perceived, it excited a desire among grave and serious persons to give some degree of authenticity to the records of the present day, which suggested the idea of marking down the most interesting events in a sort of journal continued with regularity for a long series of years; which kind of record assumed the name of *annals*. This mode of writing can, of course, consist only of unconnected notices of simple events, the preparatory causes and the consequences of which can only from thence be imperfectly conjectured. To supply this defect, ingenious men set themselves to unite these de-

tached notices into a continued narrative; and, to give that narrative the greater degree of interest, motives for the several actions of the persons who were the principal agents were devised, which were represented to be the leading causes of these actions; consequences also were ascribed to these actions, according to the fancy of the writer; and this kind of narrative assumed the name of a *history*.

This, I believe, will be admitted to be a pretty fair and genuine account of the rise and progress of the art of writing history in modern Europe. At first, the deviation from the routine of annal writing was inconsiderable. Much labour was employed to collect together the events that had been already recorded, and few were the attempts to assign causes for them: but, by degrees, the case was reversed. Instead of the narrative being principally made use of for connecting the facts together, and methodising them into some kind of order, the narrative was made use of chiefly as a vehicle for displaying the ingenuity of the author; and a few facts only were introduced with a view to corroborate, as it would seem, the authenticity of his narrative. Under these circumstances, it was natural to think that such facts as could not be made to accord exactly with the author's reasoning should be wholly omitted, as the mention of them could only tend to embarrass his narrative, to stop him in his progress, and thus to mar the elegance of his composition, and disgust his readers. History, by this means, becomes rather a species of novel than a faithful record of events; and that novel must be modulated so as to suit the talents and the views of the writer. It becomes rather

a specious mode of diſseminating the opinions that he wishes to propagate, than a faithful record of the times to which it is said to relate. In this manner we are furnished with histories, of the same periods of time, of all denominations. About the beginning of the century just concluded, our histories were chiefly divided into Whig histories and Tory histories. These had succeeded to the two grand divisions of the Catholic and the Reformed. During the greatest part of the century itself, there was a struggle for superiority between the Aphoristical and the Atheistical or Deistical historians, who employed their chief exertions to render their writings as attractive as poſsible to their readers, without seeming to be much interested as to the authenticity, or the reverse, of the information that they conveyed; and now we have attained the period of Jacobinical and Monarchical historians. Thus it happens, that the reader who wishes for sober information respecting the real state of things at the different periods of time which attract his attention, finds it next to impoſsible to obtain it. He is toſsed about in a sea of troubles; and, after he thinks himself fully informed by one historian, is in a very short time reduced to the neceſsity of perceiving that he has just once more to begin from where he had set out, and to travel the same road over again, which he finds now ten times more difficult and obstructive than at first. This is such an irksome task, that most persons turn from it with disgust, and give themselves up as willing victims to the leader whom they have first adopted, and follow him blindfold through all his deviations. Hence arise those multiplied and perpetually

jarring opinions that so much prevail in society respecting the propriety, or the reverse, of every important transaction that the experience of former times could furnish facts to determine upon. And I have no doubt that it was owing to this kind of uncertainty with regard to these particulars, that the propagators of revolutionary principles throughout all Europe, setting aside the experience of former times as a rule for conduct, have found it an easy matter to induce literary men in general to rely on speculative opinions alone, as a safe rule of conduct in regulating the momentous affairs of common life.

Under these circumstances, it would be a very bold attempt in any one even to try to give a specimen of historical composition upon the true plan that it ought to be made to assume; and we are reduced to the necessity of only offering a few hints to induce the reader to attend to some circumstances that may tend to prevent him from being led unawares into error on this subject.

It has been too much the fashion in all historical narratives to consider the *people* as having no influence on government; so that the views of the reader, as well as that of the writer, have been directed to the rulers only; and all events have been supposed to originate from the inclinations or operations of the rulers only; whereas, in fact, the ideas of the rulers of every nation have been influenced by the spirit of the times, which derive their origin from the manners, habits, and occupations in which the great body of the people are principally employed: while, therefore, we remain totally ignorant of the last, we must perpetually form

erroneous judgments of the first. This is one of the most prolific sources of error respecting historical compositions; and it has been so seldom adverted to, as scarcely to have produced a single effort to correct it. Owing to this unobserved circumstance, the writers of every age and country judge of the motives for action and the causes of events according to the standard ideas of their own times; although it is obvious to every thinking mind, that an incident which would have been capable of producing the most irresistible effects in the days of Charlemagne, could produce no sensible effect on human affairs at the present hour; and the reverse. The historian then, instead of supposing that all mankind have been influenced by the same considerations that would actuate himself, should proceed like the skilful dramatic writer, who ought not only to be able to assume the character that he means to delineate in its most minute peculiarities, but to transport himself into the country in which he lived, and to assume the ideas that he derived from his nurse, and the objects around him, as they have been modulated by the conversation of those with whom he associated, and the prevailing customs and manners of the times. If he cannot do this, the most exact knowledge of the events themselves that have taken place can convey no true lesson of wisdom to his mind.

In forming our notions too of the progress of improvement, or the gradual changes that are known to have taken place in states, and of the causes that have led to these, we have been too much accustomed, in consequence of the refined reasoning of the speculative historian, to attribute a great deal too much influence

jarring opinions that so much prevail in society respecting the propriety, or the reverse, of every important transaction that the experience of former times could furnish facts to determine upon. And I have no doubt that it was owing to this kind of uncertainty with regard to these particulars, that the propagators of revolutionary principles throughout all Europe, setting aside the experience of former times as a rule for conduct, have found it an easy matter to induce literary men in general to rely on speculative opinions alone, as a safe rule of conduct in regulating the momentous affairs of common life.

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to the plans of statesmen, and the preconceived designs of individuals; and too little to accidental circumstances, which have in human affairs a much more powerful influence than we are willing to admit. Perhaps there is no instance of any man, who has attained to so great eminence in politics, in philosophy, or in physics, as to have occasioned very great changes in regard to any of these particulars, setting out in his pursuits with a steady view of obtaining the object he aimed at by the means that were ultimately employed to effect it. He is, at the beginning, stimulated to action by certain impulses, which he follows with great eagerneſs, till some accident discovers circumstances that excite new prospects, and awaken ideas that never before had operated upon his mind; he is thus led blindfold, as it were, by fate, sometimes to a throne that he had not the most distant idea of ever attempting to obtain at the outset of his career; sometimes to a gibbet, that was aſsuredly not the object of his contemplation when he determined to pursue the road that led to it; and often, I have no doubt, men who have by one accident been induced to think of certain projects, have by another been induced to relinquish them, without having ever communicated an idea of them to any human being; so that the effects they produced have neither been suspected nor known. Yet such is the propensity of man to display the powers of his understanding, that these accidental circumstances are, in general, thrown entirely out of the account; and the enterprises of every great man are usually represented as the neceſsary result of a plan steadily pursued from the beginning, and finally

accomplished in the manner that was originally intended.

ON THE ORIGIN OF PARLIAMENTS, AND THE FEUDAL SYSTEM.

The influence of accidental circumstances on human affairs cannot be better illustrated, than in the history of the rise and progress of the British parliament and constitution of government, when compared with other institutions, which were all originally of exactly the same nature, but which at length, by gradual modifications, have assumed so many different forms, that it is only in regard to a few particulars that we can now trace any kind of resemblance between them.

After the destruction of the Roman empire, the greatest part of the barbarous states that occasioned its overthrow, from a great similarity of circumstances affecting the whole, established governments very much of the same nature. The basis of this system was conquest; and the subjugation of the conquered nation the great object aimed at. It is well known, that these savage tribes, issuing from the inhospitable regions in the north of Europe, spread themselves over the more fertile districts, under the command of ferocious leaders, accompanied by their wives and families, with a design to conquer, and to seize for their own use all the possessions of those people whom they should be able to subdue. As happens in all savage states before a regular government has been established, all authority among them was derived from the influence of personal character alone. When a person of acknowledged prowess, and superior talents, devised the

plan of a predatory excursion, his intentions were no sooner known, than a band of men, who were conscious of their own inferiority, and in hopes of deriving benefit from his superior powers, voluntarily agreed to bear a part in the expedition; each of them afsuming the rank that the general voice afsigned to him. If that station did not suit his own idea of his importance, he abandoned that leader, and attached himself to another; and, as the subjection of the whole was voluntary, they were all considered as alike entitled to receive such a portion of the conquered spoils as the general voice of the whole should afsign to each, and were bound to submit to every law that should be enacted by the same authority.

Such is the origin from which sprung that afsembly of free-men which has, for many centuries past, made such a conspicuous figure in the history of Europe under the name of *parliaments*; and which forms the most conspicuous feature of that system of political economy which has long been called the feudal system; concerning the origin of which (like the origin of most other beneficial discoveries and useful inventions, which chance, convenience, or neceſsity have suggested the propriety of at the time, and the utility that resulted from them induced them to be continued and gradually improved upon as circumstances suggested the idea of), many conjectures have been offered in vain: nor is there the smallest probability that ever this can be discovered by the evidence of record.

But, although the time when, and the place where, this system of polity first had a beginning cannot now be traced, we can easily perceive what was the state of

society where it was first established, and what were the circumstances that must have given occasion to the first modifications that it received, before the period whose records have preserved the memory of these transactions; for the arrangements are so obviously the result of neceſsity, that there can be no room for hesitating to give our aſsent to these propositions.

Among a people ignorant of agriculture, inhabiting a cold region, the want of provisions must soon be experienced to such a degree, as to compel them to attempt by the force of their arms to take poſseſsion of some district within their reach, that was inhabited by a people farther advanced in civilization than themselves, who, by being accustomed to practise the peaceful arts of industry, would be poſseſsed of the objects in the highest degree alluring to these savage invaders; at the same time that, being leſs inured to the perilous exertions of continued warfare, they will be able to oppose only a feeble resistance to their warlike invaders, who, like wolves among a flock of sheep, would soon be able to carry every thing before them, and gorge their appetites with the abundance that their rapacity had thus insured. But as a few customs arising from the natural strength of some of the claſses of human beings, and the weakneſs of others, supply the place of laws among a nation of hunters, scarcely any other political subordination is known among them, than that which power or superior wisdom naturally and neceſsarily aſsumes over weakneſs or imbecility. We may therefore conclude, with no small degree of certainty, that the feudal system of polity

could not take its rise among men in these circumstances.

But as their numbers increased, and the paucity of provisions stimulated to greater exertions, war and plunder among other men would be a most natural transition from hunting; for, what can be so natural as for those who have been in the daily practice of pursuing, destroying, and converting to their own use the spoils of one animal, as that of pursuing the same system in regard to another? A nation of hunters, then, being neceſsarily a set of savages inured to blood and rapine, who have been occasionally accustomed to arrange themselves into bands, to be enabled by their united strength to do what they could not have power singly to accomplish, such bands of armed men so nearly resembled an army going to the attack of other men, that nothing farther is required to constitute it such, but the greater precautions for safety and succeſs that are neceſsarily suggested by the greater danger to which they expose themselves when they come to contend with men than with wild beasts.

The efforts of many individuals can never be rendered efficacious where difficulties oppose, but by subjecting themselves to one common will, by whose operation their efforts may be concentrated and directed towards one point: hence the neceſsity of subordination; but no idea of subjection can be entertained among such a people, unleſs it be to evident and universally acknowledged proweſs and superior understanding. These qualities alone can exalt an individual above others; and, wherever one among them poſseſsed these qualities in an eminent degree, he

would be naturally appointed their commander, under whatever name his authority should be exercised. They exalt him, however, to this dignity only through love and respect; and the moment that respect is withdrawn, they withdraw their confidence, and his power is at an end.

While they are engaged in the progreſs of their warfare, things will go on in this train without any difficulty. When danger is imminent, being always together, the chiefs will naturally aſsemble to deliberate upon the most proper mode of procedure; and the result of such deliberation will be communicated by each leader to his subordinate followers. No particular stipulations for these modes of procedure will be deemed neceſsary, but the exigency of the moment will determine their conduct.

But after a conquest was accomplished, and the parties concerned wished to enjoy the fruits of it, then difficulties would occur, that would tend to frustrate their hopes and their wishes, unleſs effectual measures should be taken to guard against them. It was then that the neceſsity of adopting some steady system for collecting their forces and bringing them to act with vigour on sudden emergencies, became apparent: nor is it difficult to perceive in what manner, with the habits to which they had been accustomed, and the modes of thinking that had been peculiar to them, the feudal system of tenure would grow out of the circumstances in which these people were placed.

From Tacitus, and other Roman historians, we learn, that, in fact, the German tribes in his time were actually in the state that any one who contem-

plates their mode of finding subsistence at that period would naturally conceive it must have been. People who are in the state of hunters have no conception of individual property in soil. Indeed, to them it could be of no use. The whole territory occupied by one tribe belongs to the community; and each individual has a right to range along the whole of its extent in search of prey. Whatever extent of territory, therefore, they gain or lose, it adds to the emolument, or diminishes the enjoyments, of the whole of the members of the community, without increasing the wealth of any individual. Even in the pastoral and patriarchal state, ideas of a similar sort prevail.

But when the population became too great for the supply of provisions by means of the chase, or simple pasturage, they were obliged to have recourse to the labours of agriculture to augment their means of subsistence. And as, for that purpose, they must fix upon a particular spot where they might abide so long at least as to reap the crop; and as great labour must be incurred in turning up the soil, and fencing it in from the depredations of cattle; this would be at first performed by the joint efforts of a number of individuals who congregated together for that purpose; and the produce would be reckoned the common property of the whole inhabitants of that small community or village. Such at the present moment are the *craals* of the Hottentots, and other savages in Africa and America.

An approximation being thus made to the idea of private property in land, it would naturally be extended so as to come to individuals, by first coming to small

communities, and so on down to private families and individual persons, who had been at pains to cultivate their own little fields without the aſsistance of others.

In this state are the tribes in Germany represented by Tacitus to have been, in as far as respects territorial property, in his day: and property would, no doubt, remain in this situation in every independent state, as long as the inhabitants continued to cultivate the arts of peace, and to live upon the produce of their own domains. But other arrangements became neceſsary when, as a warlike people, they acquired poſseſsion of extended dominion.

Having been long accustomed to consider all territorial property as belonging to the state, it would follow, that when new acquisitions of *cultivated* land were made by such a people, these lands also would be accounted the property of the community; but, as it had been seen that cultivated land could only be managed properly by individuals to whom it had been appropriated, they would find a neceſsity for appropriating these cultivated fields to individuals; and the wisdom of the *concilium commune* (for so that aſsembly which hath since been called parliament was at first denominated) would be exercised to discover upon what conditions it would be expedient to grant it.

The first circumstance that would occur to the members of that aſsembly, as of indispensable neceſsity, would be, to provide an armed force, that should at all times be ready to be called forth for public defence whenever it should be deemed neceſsary; and, as the individuals to whom the land could alone be appropriated were the only persons on whom reliance could

be had for defence, it was neceſsary to devise some effectual means of collecting them into a body whenever occasion should require it. This kind of servitude, then, seemed to be the most proper condition that could be devised, under these circumstances, for the tenure they were obliged to grant. Here then we have the natural origin of *military tenure*; a circumstance that peculiarly characterises the feudal institution.

But as it was difficult to devise a deed by which every individual should be subjected to the common will of which he himself formed a constituent part, and as it was understood to be a neceſsary condition of the grant that was in contemplation, that the individuals who formed the great national council were to separate, and each retire to occupy his own domains, there was a neceſsity for devising some plan for watching over the public safety while individuals were attending their own private concerns; or, in other words, for establishing a stable government which, in the absence of the great council, should be vested with authority and power to watch over the community and to protect it from danger, by summoning the forces together, and directing them to act in the manner that exigencies should require. And as the military leader, under whose command the victories had been achieved, would naturally be deemed the most worthy to be entrusted with this high authority, they of course invested him with this supreme civil power as well as with the military command; which were, under these circumstances, so intimately connected, that it was difficult to form an idea of the poſsibility of their being dis-

joined. Hence the origin of that supreme head who was denominated, indifferently, *princeps*, *dux*, or *rex*—*prince*, *commander*, *king*.

On this chief then, who, by common consent, was vested with supreme power during the absence of the general council, as representative of the whole community, they conferred the power of enforcing the condition of the tenure. To him they swore fealty as their liege sovereign, whose call they were bound to obey, or to forfeit the whole of the property which they held under that tenure. Thus it was that all the lands in the kingdom were said to hold *of the king*; and though in after times the distinction between the king, as sovereign of the state, and the king, as an individual person, was in many cases lost sight of, there can be no doubt that it was at the beginning, to the office in reality, though to the person who held that office nominally, that they swore fealty; and that it was understood that the moment that king should, by the voice of his constituents, be removed from the office, the oath of fealty would have been deemed null, and that it would in that case have been tendered anew to the person who should be, by voluntary choice, put into that situation.

There can be as little doubt, that the office of king was at first conferred merely from personal considerations; and that, so far from being transmisible to his descendants, it was understood to be revocable at any time by the public will declared in parliament, which was clearly recognised as the only sovereign of the state (though no stipulations for that purpose were expresly provided) and of course omnipotent in every

thing that respected the welfare of the community; so that this regal authority was not even conferred for life, but during good behaviour only. It will be easy to trace the causes of the subsequent deviations in regard to this particular.

It is a necefsary consequence of all these considerations, that the person invested with the supreme command would have his proportion of *private* property aſsigned to him by the grand council, as well as every other individual; which would be deemed his own private property, as much as that which was allotted to other private individuals; and for which he would, no doubt, have been obliged to swear fealty as a feudatory to any other person who should be invested with the real office in the event of his being displaced from it: and I have no doubt, that examples of this kind might be found by those who are curious in such researches.

But as the king, in consequence of his being invested with the supreme power, was obliged to watch over the public safety, to the neglect of his own private affairs; and as he was, besides, obliged to be subjected to great expences and trouble in the public cause; for the purpose of enabling him to defray these expences, and to add to the splendour so necefsary for strengthening power, certain portions of land were, no doubt, apportioned to the crown, which went along with that crown on whomsoever it might be conferred, without any personal reference to others; which gave origin to that division of property that has in after times been called *crown lands*. Other revenues were afterwards appropriated to the crown, which it would be im-

proper at the period we now examine to bring under view.

We have been thus enabled to trace the origin of those circumstances which constitute the leading characteristics of the feudal system. In some subsequent Numbers of this work, we shall give a cursory glance at the incidents which served to modify these, and to make them assume that striking diversity in the discriminating features of some of the most remarkable institutions which naturally sprung from these, particularly the British constitution, which it so much behoves the inhabitants of this country fully to understand.

To the Editor of Recreations in Agriculture, &c.

DEAR DOCTOR, Manchester, March 7, 1801.

I HAVE noticed your publication of my letter upon the subject of raising potatoes from the young shoots, instead of using setts in the common way; and likewise that the result by no means corresponds with what you should be led to expect from your own experiments and observations. I have no doubt that you conclude, I must in some way or other have been deceived; and therefore I think it my duty (as the season is now at hand for ascertaining with the greatest precision how far the mode may be generally useful upon a large scale) to state to you, that you may be assured of the accuracy of my former experiment in every respect, and that there was no deception in any part of it, as I myself selected the shoots and planted them. I daily watched their growth,

which (as I before stated) only appeared too vigorous; this may be attributed to the richneſs of the ground. When they were taken up, a number of my agricultural acquaintance were present, who were witneſses of the produce, and all highly gratified by the result, which was 75lbs. from 50 plants, or 1½lbs. from each, as near as we could calculate at the time.

I know too well the fallacy of trusting to single experiments to build upon them; and I might, in this particular instance, be accidentally fortunate in the size and consistence of the sprits, as well as in the time of planting; and the dry season might likewise co-operate to insure a more than ordinary succeſs; but I am happy to be able to state, that the result of a similar experiment, made by a gentleman of this neighbourhood in the last year, has been nearly equally satisfactory. He states, that he took 11 ounces of sprits and (from his fear that many of them might fail) planted them very closely together in a garden bed; that they came up, as he believes, without any failures, and were consequently *much too crowded*; so that it was impoſsible to introduce a hoe or give them any of the neceſsary attentions during the period of their growth; but that, with all these disadvantages, he gathered a crop of 29½lbs. from the 11 ounces of sprits, which is an increase of 42 fold from the weight planted.

Another gentleman of my acquaintance, the same season, took six potatoes which he wished to increase as much as poſsible (being a favourite kind), and in the first instance procured as many sprits from them as he was able; he then cut the potatoes into setts the usual way, and planted the whole, which produced half

a bushel of fine potatoes from the six with which he made the experiment. He aſserts, that the produce from the *sprits* was in every respect equal to that from the setts, and that, in fact, he could discover no difference.

I am at this time preparing a quantity of ground, upon which the experiment shall be repeated with all the care in my power; and you shall know the result, whether it confirms that of the last year, or overthrows it; as I have no favourite system which I wish to support, but to build my knowledge on the substantial ground of truth.

The price of potatoes this season is so very enormous (5 guineas having this day been given for 3 loads of 240lbs. each), that not only is the value of the setts a serious consideration; but I hold it a duty to the community to reduce the consumption as much as poſsible; and therefore must differ from your correspondent in the twenty-fourth Number of the RECREATIONS on the above grounds, as likewise in supposing the sprits liable to damage in so great a degree as to render the use of them not important. From the single experiment that I made, I cannot presume to give advice, or to say what size will be the most advantageous; but I made a point of selecting the thickest and shortest, with a good bunch of fibres at the base, and not exceeding 1 inch or 1½ inch in length, as I found such had suffered leſs from evaporation during a week that they had been exposed to the weather, than those which were longer, and, being flaccid, were in my opinion leſs eligible.

Being anxious that you should poſsesſs all the information that I could give you, in time, that some

of your correspondents may be tempted to make the experiments themselves this season, I must apologise for the haste in which I have been obliged to write. Believe me truly, dear sir, your faithful humble servant, J. L. PHILIPS.

I should consider experiments of this nature to be decisive only when the trial was comparative; that is, along with others reared from sets of the same kind of potatoe (whose weight, individually, were ascertained) planted at the same time, on the same soil, and equally cultivated; and when the weight of produce of each per acre or pole was ascertained. *Edit.*

Characteristic sketches of the manners of the people in Rome. Translated from Gorani.

COURAGE OF THE ROMAN WOMEN.

EXTREMITIES touch: the Popes, who exercise the most despotic authority, keep the minds and bodies of their subjects equally bent under their yoke; these sovereign pontiffs, so much respected, are often exposed to hear very harsh expreſsions from the lowest claſs of the people.

In my last visit to Rome, oil was extremely dear during the month of October: the Pope was accused of having made a monopoly of it, and this charge was not unjust; for the apostolical chamber, which has the direction of the very holy finances, exercises the most odious monopoly not only upon corn, but upon every other sort of merchandise. I was at dinner very quietly in my apartment, when my servant told me that there was a great noise in the street, and that the Pope was paſsing through it on foot, followed by his

carriages. I ran down stairs to see what was going forward. I heard a woman, who, with an elevated head and loud voice, was talking to the Pope. She said to him, "Holy father, oil is most abominably "dear, and there is great difficulty in finding any at "this high price. Thou oughtest to provide for us: "the people complain, and insist that thou shalt give "thine orders for this scarcity to cease."

Pius the Sixth cast a look of indignation at this woman, who immediately exclaimed, "Go, go: I do not "mind thy angry looks; I repeat to thee, that oil is "dear, and that it is thy duty to procure some for us "at a cheaper price." The Pope pretended not to hear her, and turned his head aside; but the next day oil was lowered in price, and again appeared in abundance.

Pius the Sixth has no religion; but he pretends to be very devout. He goes every day to St. Peter's, and pays his devotions before the statue of some saint with all the transports of the most fervent piety. One day, as I was observing him act this farce, I heard an elderly woman say aloud, "The Pope plays his part "marvellously well: every one knows that he is an "unbeliever." There was much laughter at this sally; but the Pope said not a word, and his guards did not make the least movement. You must know, that the statue which receives the homages of Pius the Sixth is that of Jupiter Tonans, whom they have transformed into a saint Peter; and the thunderbolts which this god held in his hands are now become the keys of paradise.

It must be owned, that there are among the Romans of both sexes the seeds of that ancient liberty of which

this people were so idolatrous: but the priests twist and turn themselves in a thousand ways, and employ all sorts of means to prevent these seeds from expanding.

The tiara may be acquired by various means. Lambertini had made himself illustrious by many works of great merit; and his virtues and his learning elevated him to the pontifical throne. Rezzonico had always been good, liberal, of a sincere piety, and an enemy to cabals. The cardinals, tired with their intrigues, elected him, to put an end to their contentions.

Ganganelli was a very well informed man, and had pafsed through all the offices of his order. When young he was given to gallantry; but he had veiled his amours with a great deal of prudence. At Milan, however, he was surprised by the husband of the lady that he was in love with; and, being obliged to descend a staircase rather hastily, he had a fall which obliged him to keep his bed for some weeks. This accident corrected him for ever afterwards. Rezzonico elevated him to the purple; and, after the death of this Pope, he was chosen for his succefsor. To secure his election, he entered into an engagement to abolish the order of the Jesuits.

Clement XIV having finished his career, the conclave, occupied with the election of a new Pope, was very stormy. They felt the necefsity of having a clear and well regulated head. The holy spirit gave the preference to Braschi, who was elected under the name of Pius the Sixth.

John Angelus Braschi was the son of a poor gen-

tleman of Cesena. His parents sent him to Rome as soon as he was of a proper age, to solicit a canonry in the cathedral of Cesena, which he had the good fortune not to obtain. Thus the man who was destined to occupy the first place in the church, was not then judged worthy of being a canon in a small town.

Braschi had a complexion of lilies and roses, and was beautifully made. Cardinal Ruffo, a Neapolitan, an admirer of fine proportions of both sexes, took him under his protection, and lodged him in his palace. The cardinal, who was at the expence of his entrance into the prelateship, had besides caused to be given to him a canonship in St. Peter's, and at his death left him an annuity.

Braschi, after this, became the lover of the mistress of the cardinal Rezzonico, nephew to the Pope. She it was who obtained for him the place of grand treasurer, and afterwards the cardinal's hat, which Clement XIV gave him, in order to deprive him of the treasurership, in which office he had practised much peculation. When Braschi went to thank his holiness for the hat, Ganganelli had the frankness to tell him, "I made you a cardinal because I wished to give "the place that you held to a person whose probity "was undoubted." He little suspected that the person whom he treated in so offensive a manner would one day be his successor.

Braschi is not learned: he has never composed any one work that can be cited. He speaks with facility, but without any depth of thought; so that his conversation is a tissue of brilliant expressions, but without any thing new or profound. His agreeable tone of voice, however, the beauty of his physiognomy, and

the graces of his action, give a charm to his expreſsions, of which they would be destitute without these acceſsaries. In a word, he is a most excellent actor, and nothing more. Some cardinals and Roman prelates found fault with Benedict XIV, for the facility with which he had agreed to the suppreſsion of the daterie of Spain. They even reproached him with it. But Lambertini, who read futurity, replied, "Let us "give thanks to Providence, that the king of Spain "has been so kind as to ask our permiſsion to make "this reform, and for his generosity in giving us so "large a sum as a recompence for it."

Clement XIII (Rezzonico) was full of clemency and humanity. He was a man of enlightened understanding also; but had too strong prejudices of the superiority of the holy throne above all the other thrones of Europe. He was censured for his nepotism, a weakneſs common to many Popes.

Clement XIV poſseſsed the virtues of his predeceſsor; but he more resembled Lambertini in his erudition and his knowledge of the age he lived in. Rezzonico had lost every thing by his obstinacy. Ganganelli regained every thing by his suppleneſs; he spoke the language of reason, and was listened to.

Pius the Sixth has almost ruined every thing. He has fallen into embarraſsments, often in a ridiculous manner, and has much weakened the pontifical authority. Rome does not even suspect half the mischief that he has done. In short, to conclude, one may say, that few Popes have resembled Ganganelli; that there are still fewer who can be compared with Lambertini; but that the history of the Popes exhibits a very great number of Rezzonicos and Braschis. One need not

be astonished that such a man should have been raised to the tiara, when we advert to the intrigues that are agitated in the conclaves, and the collision of different parties, who, in order to come to an agreement, allow their nomination to fall on some cardinal who has no other merit than to be unconnected with the ruling factions. These are the secret springs to which Pius the Sixth, like many other Popes of the same sort, owes his elevation.

Remarks upon the "Report of the Board of Agriculture to the House of Commons respecting the culture of Potatoes," just published. (March 6, 1801.)

WITHOUT meaning to oppose any obstruction to the well-meant efforts of the Board of Agriculture and the House of Commons to encourage the growth of potatoes in this kingdom, but rather wishing to co-operate in forwarding that intention, by removing some unobserved impediments to that exertion which the reading of the above report has suggested, I beg leave respectfully to submit the following remarks to the consideration of the public; which, however, I should not have been induced by any other consideration than that of the general weal to have brought forward at this time.

1st. It is very evident from that report, that the gentlemen who drew it up conceive it to be an undeniable fact, that early kinds of potatoes are universally and necessarily less productive than those which come to perfection at a later part of the season only; for, after having mentioned those sorts which ripen in

June, July, or August, they add, " but these sorts are " not greatly productive in quantity, and may be con- " sidered rather as an article of luxury, than as an ob- " ject of general consumption." This I conceive to be a position aſsumed without any sufficient proof; and which, if acquiesced in without farther examination, may be attended with very ill consequences; as it may stop the progreſs of beneficial improvements that might tend greatly to augment the general productiveneſs of this kingdom; on which account, I wish strongly to direct the attention of the public to this subject at the present moment.

That some of the early sorts of potatoes which are now cultivated are of a leſs productive nature than some of those kinds that are of a later growth, cannot be doubted: perhaps it might be admitted, that *most* of the early sorts now cultivated are of a leſs prolific nature than most of the late kinds now in use; but even admitting this to be the case, it would by no means authorise the conclusion deduced above. That some sorts of late potatoes are much leſs prolific than some varieties of the early kinds, I know to be a fact; and if the most prolific sorts hitherto discovered be of the late sorts, it is merely accidental; for, whoever has raised potatoes from seeds must know that it frequently happens, that many *late* sorts are so extremely unproductive as scarcely to yield any crop at all; all of which are invariably thrown aside; so that, if these had been preserved and perpetuated, the balance in point of productiveneſs would, in all probability, have been in favour of the early kinds. From the experiments that I have made in raising potatoes from seeds,

I can see no reason for entertaining the smallest suspicion, that the quality of productiveneſs is more nearly connected with the late than the early sorts; nor have I the smallest doubt, that by a proper degree of attention, continued for a sufficient length of time, early kinds may be discovered that are even more productive than any of those varieties of potatoes which have been yet cultivated.

It is also a prevailing opinion, that the early sorts are better flavoured, and more pleasing to the palate, than those which ripen later; but in support of this, I have met with no decisive facts; though this opinion be also in part maintained by the foregoing report; in which it is said, that they may be accounted rather an article of *delicacy* than of utility. I have found some very early sorts that have been raised from seeds of as watery a quality, and as disagreeable to the palate, as any others that I have yet seen; so that goodneſs of quality and delicacy of flavour are by no means neceſsary concomitants of earlineſs. It ought, however, to be admitted, that there is a greater chance of finding bad potatoes among the latest sorts, when raised from seeds, than among those that are earlier; and for this good reason, that if they do not attain perfection before the cold weather comes on, they cannot in any case be good; for even those which, if ripe, would have been good, must be bad, because they have not had season to bring them to maturity; whereas the early sorts are all permitted to attain the highest degree of perfection of which they ever can be susceptible. Nor can any one who is not conversant in experiments of this kind form an idea of the vast diver-

sity that takes place respecting the time of ripening among this clafs of plants. I have known some plants of potatoes raised from the same seeds, that were fully ripe, and the stalks quite decayed, in the month of July; while others were only preparing to form their bulbs in the beginning of November: these last, therefore, could not be deemed either pleasing or productive; though it is by no means impofsible that they might have been both, had the season been prolonged so as to bring them to perfection.

From these considerations, then, I am satisfied, that the inference so plainly insinuated by the Board of Agriculture is premature, and not supported by facts; that, of course, it has a neceſsary tendency to lead the minds of those who pay respect to it into a train of erroneous reasoning, which stops the progreſs of improvement; and that it consequently counteracts the very intention of the Board itself. I could, therefore, have wished that this article had been entirely omitted in the report on the present momentous occasion, when too much pains cannot be taken to avoid every thing that is of a doubtful, far more of a pernicious tendency.

2nd. Under the second head, I meet with a position that is expreſsed in a manner greatly too vague for the occasion: it runs thus. "But potatoes may be brought into use by being gathered before they arrive at maturity. The Board does not conceive that the committee would wish to sanction this practice by parliamentary premiums; as nothing short of real diſtreſs can justify the consumption in *July* or *August* of *one hundred* bushels from an acre of land, which in

October might produce *double* the quantity, and of a quality more fit for human sustenance."

Doubtleſs the general position here is just: viz. that it would be very uneconomical to dig up potatoes in July or August, which continue to grow, and do not obtain maturity till October; but a very inaccurate notion is conveyed of the actual loſs that would be incurred by an attempt to practise what is here disapproved of. It is very evident, that the writer of the above article had never made any experiments with a view to ascertain the proportional loſs that would be incurred by this premature gathering of potatoes; for if he had done so, he must soon have perceived, that after the potatoe bulb begins to be formed, it increases in size with a degree of rapidity so much beyond what is indicated in the above paragraph, that, instead of requiring two months to double its produce, it will do much more than increase to that amount in *one week*. There can be no doubt, that many of the sorts of potatoes which will afford a very abundant crop in October have not begun to put forth their *umbilical* fibres, to which alone the bulbs are attached, in August. Even after the bulbs are formed, and have aſsumed the appearance and somewhat the taste of the potatoe, while they are still in a state of vigorous growth, they will do much more than double their size in *one week*; so that those who take up this kind of potatoe prematurely, lose greatly more than is indicated in the report; and the practice ought, of course, to be prohibited with a much greater degree of earnestneſs than is here done. I am satisfied, that the loſs which the nation sustains annually by this practice is infinitely

greater than it is at this moment conceived to be; and I take this opportunity to warn all my readers to guard against the very great diminution of their income, which will unavoidably result from such a practice.

That the full meaning of the above observations may be comprehended, it may be necesſary briefly to inform those who have not adverted much to this subject, that when potatoes are reared from seeds, a variety of kinds are obtained which are much more diversified in their qualities than any one who has not made the experiment could easily imagine; that each individual plant forms a distinct variety, which differs from every other variety in existence in one respect or other; and that the peculiarities of each can neither be determined from any known circumstances *à priori*, nor can they be afterwards ascertained by any other means than that of fair and accurate trial; that some individuals will ripen very early, and others very late; that some will be very steril, and others extremely productive; some sorts rich, dry, and pleasing to the taste, while others are harsh, watery, and nauseous; and so on: but that no two qualities are necesſarily conjoined together; that is to say, an early potatoe may be rich and pleasing to the palate, or the reverse; may be productive or steril; large or small; and so with the late sorts; but that these qualities are in no way connected with each other. Thus it may happen, that an early kind may be extremely productive and palatable, or the reverse; and a late kind may be unproductive and unpleasant, or the contrary. These are facts which I venture to state from my own experience and repeated

observation; and I am by no means afraid that future experience will invalidate my observations. If this be so, it will follow, that it is of much importance to guard against drawing general rules for connecting any two qualities or peculiarities together as neceſsary, because this leads the mind astray in pursuit of fanciful analogies, that have no foundation in nature. They may or may not be conjoined or separated in any one instance.

It is also a fact, that the potatoe, for the most part, does not begin to form its bulbs till the time approaches when they will attain to maturity; and then they advance with a rapidity that is inconceivably great, till they attain nearly their full size. I have frequently found, that by taking up a certain number of stems in a patch of potatoes when the bulbs begin to knot; that is, to be perceptible, in one or two days they will double their size, and from that period advance nearly in the same progreſsion till they attain nearly their full dimensions; so that the diminution in produce is much greater when taken up before they have attained maturity than is usually imagined.

3d. I remark what I should conceive to be another inadvertence in the following notice; viz. "To the person who shall - - - - cultivate - - - - the *greatest number of acres* of potatoes, producing on an average not leſs than 200 bushels per acre, each bushel weighing not leſs than 60lbs .....300l."

It too often happens, that in offering premiums to induce persons to cultivate certain articles, those who hold out the premium pay too much attention to the quantity of land, and too little to the amount of pro-

duce afforded by that land; the consequence of which procedure is, that, instead of stimulating to powerful exertions to produce an abundant produce from a small extent of surface, which alone can encourage the farmer to continue to cultivate that crop for the sake of his own emolument after the premium is withdrawn, it induces nothing but a transient effort for obtaining the premium by a man who has no other claim to it but that he poſſeſſes a larger farm than another. In all cases this has rather a hurtful than a beneficial tendency; but in the present case it is peculiarly so, because it neceſsarily abstracts a great proportion of land from other crops without augmenting the general produce of potatoes in the country. To make this position more obvious, I shall state the following case:

That 200 bushels of potatoes from an acre is not a *maximum* crop, is well known by almost every person who has ever cultivated potatoes: that it is much below an average crop, when this is reared by good farmers, is well known to many: that it does not amount to one-fourth of what may be reared on the same extent of ground by skilful culture, is known by a few. I have myself had, at one crop, at the rate of more than thirty tons per acre; and I know that the same produce has been obtained by others: nor do I conceive that this (great as to some it may seem) is nearly the utmost poſsible amount of crop (poſsibly not the half) that may be obtained from an acre of land. Let us suppose, however, for the present, that one man who poſſeſsed a farm of small extent, but who cultivated it with skill, and a due attention to all circumstances, could only appropriate 30 acres of land to the culture

of potatoes, from each acre of which he reaped 30 tons, which is, of bushels at 60lbs. each, 1120; in that case the crop from his thirty acres would be bushels 33,600
The produce of 100 acres at 200 bushels each is 20,000

The balance in favour of the 30 acres is..... 13,600

which is equal to the produce of 68 acres above the hundred. Which of these two men, I ask, should be accounted the most deserving of a national premium? The answer is obvious: yet, according to the terms held out to the public, the slovenly farmer must obtain the premium, and the other be entirely excluded from it. Many other reasons might be adduced to show, that this mode of holding out premiums to the public is injudicious, and attended with pernicious consequences; but it is hoped that the above hint will be sufficient to direct the public attention to this object in future; and more than this is not at present intended.

The premium to cottagers is much more judiciously conceived; though that also verges into the other error in certain respects. Little good, however, can be expected from such premiums in any way, when continued only for one year.

What the intention is of proposing to grant so high a premium as 1000l. to the person who shall cultivate *by the spade* 20 acres for potatoes, I cannot conceive; especially when I observe, that the produce is not required to exceed 200 bushels per acre. I should think that such a person would be more deserving of a *fine* than a premium, were it not that he would be sufficiently punished for his want of economy if he did not obtain the premium.

4th. Though I can more easily understand what was *meant* by recommending the practice of scooping out the eyes of potatoes for planting, I cannot the leſs regret the precipitancy of the Board in thus recommending, with such unequivocal decisiveneſs, a practice which, to speak of it in the most favourable way, must be accounted of at least a doubtful tendency. The article in the *report* respecting this particular runs thus: "As the saving of seed is an object of great "importance for extending the culture of potatoes, the "Board desires to remark, that *it has been ascertained* "*by experiments*, that the eyes of potatoes cut out "with a semicircular-edged scoop, so as to leave the "larger part for common consumption, may be used "advantageously for that purpose, provided such eyes "be planted on a mellow soil. When they are cut "out, they should be thinly spread, or in small heaps, "and moved from time to time till the piece cut out "becomes dry and contracted; after which they may "be kept in larger parcels, without danger of fermen-"tation; and in this state may be preserved safely "through April or May."

Had the above directions been conveyed to the public by an authority leſs respectable than that of the Board of Agriculture, I should not, perhaps, have thought it neceſsary to take any notice of it in this place; but, being recommended from such high authority, it may be supposed, that every inexperienced person will rely upon the advice with as implicit confidence as if the fact had been established upon the most undeniable evidence of clear and decisive experiment, repeated so often as to be deserving the name

of *experience* rather than of simple *experiment*. This, however, I think I may venture to controvert, not only from my never having yet heard of an experiment having been made with an intention to ascertain the fact, *that was so conducted as to entitle it to have any reliance placed on the result*; but also from my having had experiments conducted under my own eye with more than usual precision, from the result of which a conclusion directly the reverse of what is here stated might have been drawn. I do not, however, consider my own experiments as having been so accurately made, or at least so frequently repeated, as to authorise any decisive conclusion; though they afford such reason for doubting as ought undeniably to induce some hesitation about adopting in such a decisive manner an inference so contrary to the result of these experiments. I know that on this head, and many others of a similar nature, experiments have been made, without *the necessary attention to many circumstances which alone could render them accurately conclusive in any way*; in consequence of which inadvertence, the experimenters themselves have been convinced, and have *believed* that the inferences they have deduced from them were clearly and undeniably established. Among persons who are not habituated to researches of this kind, such a procedure, if not strictly proper, was at least very natural; but it surely behoved such a respectable body of men as the Board of Agriculture, not to suffer themselves to be so led away by the fascinating influence of such prejudices, as to stamp with the seal of their authority, in a case of so much moment as that in question at present, opinions of such doubtful import.

Were the Board of Agriculture desired to state the *experiments* which serve to *ascertain* that the eyes of potatoes scooped out with a semicircular-edged scoop may be used advantageously for seed, with all the precautions that were adopted to prevent a posſibility of mistakes in respect to the result, they would find it, I know, a very difficult matter to satisfy the judicious part of the public on that head. But, unleſs they can do this, it must be admitted, that they have acted with a blameable precipitancy in thus recommending it to the public. For, if it shall be found, upon accurate trial, that the practice is pernicious instead of beneficial (which I have good reason for believing will be the case), they will then have been acceſsary to leading the public into an error which may tend considerably to diminish instead of augmenting the produce of the country. It is from this conviction, grounded on experiments that the public are poſseſsed of, and others, that I conceive it to be my duty to enter this caveat, with a view to induce caution, at least, in respect to this practice, until the facts on which it rests shall be more fully authenticated. This, I trust, will be deemed a sufficient apology for my having, at this time, offered these remarks upon a publication which, on account of the beneficent *intentions* of those who drew it up, would otherwise have been allowed to paſs without observation.

Reading Memorandums.

"As protestants we must hold that no human guides in matters of religion can be infallible, either as indi-

viduals, or collectively as a church; because an aſsemblage of fallible members can never constitute an infallible body or church. Consequently there can be no man, or body of men, whom God has indispensably commanded us to obey; it being impoſsible that God should bind us to an obedience which (our directors being fallible) might engage us in error, and prove the cause of our condemnation.

"There cannot then be the least excuse for penalties or censure, when exercised on men on account of their religious opinions or practice, merely as such.

"What are diſsenters guilty of, but of presuming to be guided by the dictates of their own conscience, which, upon the principles of protestantism, they are authorized to do by God himself? Therefore, when men are persecuted and censured for religious opinions, it is an affront to the divine Majesty, whose government and laws these persecutors presumptuously attempt to reform and amend."

"There is a certain strength in honesty which nothing can vanquish; and which, if sensible men are firm in their opposition to aſsumed authority, must in the end prevail."

"The character of a covetous man is, that he getteth his goods with care, and envy of his neighbours; with sorrow to his enemies; with travail to his body; with grief to his spirit; with scruple to his conscience; with danger to his soul; with suit to his children, and a curse to his heirs."

"I have always been of the opinion, that those who lay claim to more than human perfection have some peculiar weakneſs which they want to hide; some fa-

vourite vice which they nurse in secret, and which levels them with the rest of their species; some pleasure which they feed upon with uncommon greedineſs; and that their virtue, when most sincere, consists leſs in abstinence than repentance."

Index Indicatorius.

Neaniskos will please to accept the acknowledgment of the Editor for his obliging letter. The hints he so kindly offers shall be duly attended to; and it will be a satisfaction to the Editor to think that by attending to such hints he shall gratify his readers.

In regard to his queries respecting the best introductory books for the study of Entomology, the variety of these is so great, and the propriety of choosing one in preference to another must depend so much on the object aimed at by the student, that it would require a long treatise to say any thing satisfactory on the subject. The Editor shall therefore content himself with briefly remarking, that he knows of no book that could be considered as elementary which views the subject of Entomology nearly in the same light as is aimed at in the Recreations. Books that would answer that title are in general of the *systematic* kind; rather calculated to distinguish the varieties, and to arrange them into claſses, than to mark their habits, peculiarities, and uses. Those readers who wish to enter into researches on these subjects should rather have recourse to original writers, such as Rhedi, Ray, Swammerdam, Reaumur, Bonnet, Spalanzani, and others who have written detached eſsays on particular sub-

jects in the transactions of various societies, than to systematic writers. Perhaps the pleasantest superficial glance that can be obtained on these subjects are those which are exhibited in the *Spectacle de la Nature*, and Derham's Physico Theology; though these are of neceſsity so short as to prove in some degree unsatisfactory.

The best mode of prosecuting the study, so as to avoid the neceſsity of killing the insect, is to begin with the eggs; and, by hatching these, try to trace the progreſs of the insect through all its changes. Many hints for doing this with succeſs are to be met with in the works of Bonnet, Reaumur, and the other writers before quoted.

To the numerous inquiries that have been made of the Editor concerning his improved mode of constructing and managing hot-houses, he can only apologise for not returning answers individually, by the impoſsibility of his doing so consistently with his other avocations; he hopes, therefore, the writers will have the goodneſs to accept this general answer, viz. that the patent is obtained, and the following gentlemen have agreed to conduct that department of buſineſs, viz. Mr. George Byfield, architect, Craven Street, Strand, London; Mr. David Stewart, hot-house builder and gardener, Woodlands, Blackheath; and Mr. Samuel Butler, hot-house builder, Little Chelsea, near London; who will in a short time be ready to execute works of that nature, and to explain the principle to such gentlemen as may wish to avail themselves of that improvement, to any one of whom application may be made. The Editor is preparing to publish an account

of the principle and its application in a volume by itself. In the mean time he proposes to give an idea of the principle in some early Numbers of this work; the first part of which, viz. that which treats of forwarding vines by means of the heat of the sun alone, he hopes to be able to give in the next Number, and the others shall follow with all convenient speed.

The same apology he must make to several gentlemen who have done him the honour to request his opinion and advice respecting the best mode of cultivating potatoes; the best kinds for different purposes, &c. to each of whom he would gladly communicate any kind of knowledge that he himself poſseſses on that subject; though he is sensible, from the extremely limited nature of the general knowledge of the real circumstances that affect the growth, and other peculiarities of the different varieties of that valuable esculent, that the exceptions to every general advice must be so numerous as to afford little satisfaction to the inquirer, could it even be overtaken by the writer; which, in detached notices, it is utterly impoſsible to do. That he may afford, however, all the satisfaction to the public that is in his power on this very interesting subject, besides what occurs upon it in the present Number, it is his intention in some succeeding Numbers to offer such suggestions as appear to him likely to lead to a full elucidation of the circumstances that are still wanting to improve the culture of that plant.

The communications of *Alfred—B—l—d—Sextus Quintus—A Hater of Innovations—A—LL—s*—and *Brutus*, with some others, are received.

26.

APRIL 1801.

RECREATIONS, &c.

N° 2. Second Series, Vol. I.

Observations on the most proper measures to be pursued for obtaining the best kinds of potatoes, for extending the uses of that valuable esculent, and for improving its culture.

AGREEABLE to the promise in my last, I now return to a subject that hath justly attracted the public attention to a considerable degree; and which it will be fortunate for this country if it can so long continue to attract that notice as to produce the elucidations that are yet wanted for effecting the purposes above stated.

I know of only one mode of effectually augmenting the use of this esculent, or of any other, viz. that of rendering it as pleasing to the palate of the consumer, as nutritive, and as cheap as posible.

The best way of effecting these objects is to obtain, by a careful exertion of the powers and faculties with which man is endowed, a selection of the very best sorts that can be produced, both ás to taste and productiveneſs; for unleſs a superior kind as to flavour and palatableneſs can be obtained, that is at the same time so productive as to admit of being sold at a very

low price, it will be in vain to expect that ever its use can be extended much farther than it is at present.

The following hints tending to effect these purposes were in substance communicated to the Board of Agriculture in the year 1795, and are now with such corrections and additions as have been thought necessary submitted to the reader. It will afford the writer much satisfaction if they shall now attract from the public that sort of notice that the importance of the subject ought naturally to claim: for, although it be true that it is measures that are calculated to promote the cultivation of land generally, that can alone remove the present distress; yet perhaps no one partial measure could do more than that which forms the subject of our present disquisition.

There are so few facts known with *certainty* respecting the potatoe, that I should perhaps have declined troubling the Board with any thing else than a few general remarks, in answer to the queries on that subject, had it not been with a view to guard against the effects of that torrent of misinformation which, I can easily foresee, will be poured in upon the Board from all quarters in consequence of these queries; for inexperienced men, when they have formed no accurate ideas on a subject, for the most part lay hold of particular facts, from which they draw general conclusions that favour the notions they had previously formed; and as such speculative men are in general more forward than others in offering their opinions on such occasions as the present, and as in such cases different persons cull out partial facts in this

manner, and argue upon them without diffidence, the conclusions that will result from an aggregate maſs of such information, must, in many cases, be so contradictory to each other, as to occasion only perplexity and confusion.

The potatoe is doubtleſs the most valuable esculent that is known in this climate, and highly merits a degree of attention for distinguishing its different varieties, and ascertaining with precision the peculiar properties of each kind, which it never yet has obtained, nor is likely to obtain, unleſs it be by means of the Board of Agriculture, or some such patriotic institution, because of the expence and trouble that attend the making of the neceſsary experiments, and the extreme accuracy with which they must be made, before they can be of any service to the practical farmer; who, till that be done, must continue to wade on, as he has hitherto done, in the dark with regard to many of the most eſsential circumstances that ought to regulate his conduct.

I myself have made a few experiments on this subject; which have been barely sufficient to point out some of the circumstances that are wanted. I intended to have gone farther, and proceeded some length, in order to ascertain the facts wanted; but to do it with the requisite precision, required aſsistants and conveniencies that my situation did not afford; and I was obliged to desist. It is, however, the conclusions deducible from these experiments that will form the principal subject of the following pages. In these remarks I shall adhere nearly to the same order as the queries point out.

QUERE. I. *"What are the best kinds of potatoes, and the best mode of culture?"*

This resolves itself into two queries, which, for reasons that will soon appear evident, must be considered separately.

As to the best kinds of potatoes, no answer that, in the present state of our knowledge, could prove intelligible can be given to this query, unless it be to persons who live in the immediate vicinity of the person who answers it. In every district there are local names for particular kinds of potatoes there cultivated, which are known nowhere else; so that to name them conveys no sort of idea whatever to a stranger; but, what is worse is, the same name often occurs in different parts of the country, denoting potatoes of qualities extremely different from each other; so that a person trusting to names, might get perhaps a dozen of different sorts, while he thought he was getting only one kind. He may even get two kinds of potatoes of very different qualities, under the same name, in the same neighbourhood, owing to an unobserved circumstance that I shall soon have occasion to explain; so that no information whatever can be conveyed to those at a distance by means of the name only.

If that name shall be accompanied by a description, the case will not be much altered. I have seen half a dozen or more kinds of potatoes so exactly resembling each other, that no person could have distinguished one from the other; yet each of them was extremely different from all the others in some of its most essen-

tial qualities. This circumstance is so little attended to by those who rear potatoes, that it seldom happens that you can buy a bushel of potatoes without meeting with several sorts; and this, for the most part, is the cause of that diversity of tastes, &c. that are found among potatoes out of the same dish, in using them at table.

It is now generally known, that the different *varieties* of potatoes are all obtained from seed. With a view to discover what was the extent of the varieties that might be thus obtained, I took the seeds from a single potatoe-apple without any intermixture, and sowed them: the diversity was so great, that it could scarcely be called short of infinite. The potatoes were diversified prodigiously in regard to a variety of particulars, viz.

1st. *Colour*; being black, red, white, green, yellow, pink, &c.:

2nd. *Shape*; long, and round, knobbed and varied in all proportions:

3d. *Size*; some of them being no larger the first year than peas, while others exceeded the size of the largest pullet's egg:

4th. *Earliness*; some of them having completed their growth, were entirely ripe before the month of August, while others were only coming into blosom at the end of October:

5th. *Prolificacy*; some yielding above 200, while others gave only three or four:

6th. *Spreading* under ground; some running out to a great distance, others growing quite close to the stem; some going deep down, while others rose to the surface:

7th. *Quality*; some being tough and watery, some dry and mealy; some very pleasing to the taste, others not eatable:

8th. *Stems*; some carried a single stalk like a rod, others an immense profusion of stems; some very luxuriant, others extremely dwarfish. In short, it would take a volume to describe all the varieties; but what surprised myself most, was to find that there was no sort of connexion between any two peculiarities. Two plants which resembled each other exactly above ground, were often extremely dissimilar below ground; while two bulbs, that resembled each other in all respects, were sometimes so different in quality, when tried for eating, that one was perhaps among the best, and the other among the worst of the parcel.

I have been at the pains to state all these particulars, to show at the same time the benefits that may be derived by a cautious selection from seedlings, and the evil consequences that may accompany a careless procedure in this respect. It was perfectly clear from this experiment, that no two stems produced from the same *seeds* were, *in all respects*, possessed of the very same qualities; but it likewise happened, that when the stems were taken up, many of the bulbs had such a near resemblance to each other, that when they were mixed together they could not be distinguished by the eye, though it might perhaps happen that one of them was four, perhaps ten times as prolific as the other, or was much better in other respects; but as the general practice is, among those who rear potatoes from *seeds*, to mix all those together which resemble each other in appearance, a mixed breed is thus obtained

that is, upon the whole, leſs prolific and leſs pleasing to the palate than some of the best; so that the average crop is thus greatly diminished in quantity, and rendered much inferior in quality to what it otherwise might have been: and as a practice in many places prevails of picking out the smallest potatoes for sets; and as the original potatoe always produces a progeny having the same habits and qualities with itself, it will thus happen, that those kinds which produce the largest bulbs will soon be entirely excluded from the sets. The potatoes being seen thus sensibly to degenerate, this change is attributed to some unaccountable effect of *time* in changing the qualities of this valuable esculent; and thus, instead of preserving one valuable kind, when it is once obtained, for a succeſsion of ages, it is quickly lost; and a fresh succeſsion of fleeting varieties come in its stead, and are lost in their turn, before their real distinguishing qualities can be accurately ascertained, or they can be universally diſseminated through the whole nation.

Such is the real origin of that perpetual fluctuation and uncertainty in respect to the kinds of potatoes that is observed so universally to prevail in Britain; and it is a matter of much more serious moment that it should be adverted to than most persons are aware of. It is an undoubted fact, that with the same care and management, at least *four* times the quantity of produce may be obtained by cultivating one variety of potatoes in preference to another. Nor does it any way follow, that the largest shall be the worst of the two; for though this *may* be the case, it is merely accidental, and it may as readily be the reverse. It does

indeed happen, that the least prolific sorts, if the deficiency be very remarkable, are thrown away by the rearer; and thus are lost. And it must happen, if no mode of selection for sets be adopted, that these unprolific sorts must gradually decrease from the general stock; but if they chance to be small, and if the small be reserved for sets, miserable must be the degeneration that does in this case ensue; or if they be large, and the large only are selected for plants, a similar degeneration must be experienced.

On the whole, the practical conclusion from these facts is this: that no breed of potatoes can ever be obtained *for a certainty* without admixture, but that which is the produce of a *single stem*, whether that be of a seedling or other plant: that it behoves those who wish to make a selection from *seedlings*, in the first place, to throw away all those that do not afford an ample produce, and exhibit kindly habits in other respects: that when such individuals as are desirable in these respects are once obtained, and are planted the second year, *each carefully separated from all others*, these should then have their eatable qualities particularly investigated, and all those should be banished, without mercy, which are not very good in this respect. By a selection of this kind continued, one good kind, when once obtained, could be kept without degenerating, as I have every reason to believe, for an indefinite number of years; or at least till another should be obtained, which, upon a fair comparison, should be found to deserve a decided preference, when it would naturally give place to the better. For I have never met with a single fact, well authenticated, that

tended to show that any kind of potatoe really degenerated, by a continued cultivation for a length of time, farther than what can easily be referred to the cause above explained. When potatoes were first introduced into this country, there were two kinds only known; a round red potatoe, and an oblong white kind, that went very deep into the ground. These continued the only kinds known for many years, and gave no marks of their growing worse. Other kinds at last came into use, that were thought more prolific than them, and were preferred on that account. But now that new kinds are obtained from seeds, all of which I have reason to believe are mixed from the beginning, they degenerate apace, and the new kinds disappear almost before they are known.

Nor is it from *seedlings* alone that one can make improvements in this respect: every man who has bestowed attention to the culture of potatoes *at large*, must have observed that he meets with some stems in every field greatly more productive than others. And although this may sometimes happen from a circumstance no way depending on *kind*, as I shall soon have occasion to show; yet, in general, there is room to suspect it may be owing to the parent breed. The very best of these individual stems, therefore, ought to be picked up with care and kept, the produce of each stem by itself, till their eating qualities be ascertained; when that one which is best, in *both* respects, ought to be selected for a breed, and kept by itself carefully for that purpose. I can speak from experience here with great certainty; and can affirm, that by a careful attention to these circumstances, a farmer in a very

few years will, in many cases, more than double the amount of his average crop of potatoes, soil and culture being the same. It is easy to observe, that where the original breed of potatoes has been unmixed, the extent of this kind of improvement must be far less considerable than where a mixture has taken place.

While this circumstance is not adverted to, it must occasion prodigious diversities in regard to the results respecting the produce of this plant. Two men, who are equally skilful, and equally careful in their culture in all respects, shall have returns extremely dissimilar: the produce of the one may be double to that of the other; nay, I have actually experienced last season (anno 1800) that upon the same soil, and with the same culture, two different kinds of potatoes were reared, one of which yielded a produce about *ten* times the amount of what was afforded by the other; and the eatable qualities of the least productive sort fell short of those of the other. As the idea of enchantment is now banished from this country, the careful farmer who compares his produce with that of another, and finds the difference, by account, so much against himself, is sure to attribute this difference in part, if not entirely, to exaggeration alone, or to some unaccountable defect in the *season*; to which he often ascribes an unusual failure in his own crop, which originates in the cause above stated.

In regard to the *culture* of potatoes, as I shall have occasion to resume that subject afterwards, I only take notice at present, that this must, in many cases, be influenced by the nature of the potatoe to be cultivated. Some kinds send their bulbs downward, and penetrate

to a great depth; while others push them upwards, so as to be in danger of coming above ground. The culture that would best suit the one, would be very improper for the other; so that two men, each describing the culture that he has found to be preferable to all others, may give directions almost entirely the reverse of each other. Some potatoes again push out their fibres very far, and produce bulbs only at a great distance from the stem; while other kinds produce the whole in a close cluster at the bottom of the stem only. Nothing can answer better for the culture of these *last* mentioned varieties than the horse-hoeing husbandry; though nothing can be worse for the *first*. I had once a field of potatoes of this rambling sort, the qualities of which I did not know at the time of planting; these were horse-hoed as usual very close to the stem, and as late as the state of the stem would admit; the consequence was, that most of the umbilical fibres were cut off, so that they had to form tubercles anew; and, being a late kind, it was found at the usual time of taking potatoes out of the ground, in October, that many of the bulbs were no larger than pease, and few of them above the size of a nutmeg; so that the crop was entirely lost. Few people now choose to cultivate potatoes that have this peculiarity, as they are inconvenient in many respects: nor are those kinds that send their bulbs deep in the ground so desirable, for many reasons, as those that rise upwards.

Not only may the amount of the crop be varied by the qualities of the *kind*, as above specified, but it may be also prodigiously varied by the *size* of the sets planted by way of seeds. This fact I ascertained by

a set of experiments, conducted with great accuracy, which are recorded in the Bath Society's Transactions, and inserted in a former part of this work; the result of the experiment was, that by varying the size of the sets, from two ounces downwards to the smallest cuttings I planted, the produce from the same number of sets of the largest was *ten* times the amount in weight of that from the smallest sets. Let no one however, from this fact, though duly authenticated, conclude that he might obtain a crop of ten times as much from a whole field planted with large sets, as he could obtain from it if planted *judiciously* with small; for as the plants that spring from the small sets are always weaker and more dwarfish than the others, they can be planted much closer upon each other than the others, without dwarfing them very much; there may therefore be safely grown a much greater *number* of plants on the same extent of ground where small sets are employed than where large ones are preferred; so that, although the produce of each of the large stems were equal to *ten* of the small, yet if there could be *five* (let us suppose) small stems reared for *one* of the large, in that case the real difference of produce would only be as *two* to one: if two stems grew instead of one, the difference would be as *five* to one; though the difference in point of *value* would, even in this case, be much more; for not only is it more difficult and expensive to cultivate a field properly where the stems must be placed very close together, than where they stand more apart; but in all cases the bulbs produced from the small stems are much smaller than those that are afforded by the more luxuriant plants; and it is

well known, that the same weight of *small* potatoes will seldom bring above half the price of those that are of a moderate size. I take notice of this circumstance, to obviate erroneous conclusions that might be drawn from this experiment; and the still more erroneous conclusions that might be drawn from experiments that may be made in consequence of it with the common *inaccuracy* that takes place in regard to matters of this kind. There can be no doubt, that under a proper management, the same ground, with the same manures and culture in other respects, will afford a crop of at least *double* the amount, if sets not under two ounces be employed, in place of the *smallest* cuttings that some *thrifty* managers are so careful to employ.* This is also an unobserved circumstance that frequently influences the amount of the crop very much, and which all goes to the account of the *season* wherever it is observed. No wonder if men, who are neither in the habit of adverting to the one nor the other of these circumstances, which where they chance both to concur to heighten or diminish a crop, may make a variation of at least *four* times its total amount, should differ extremely from each other in their idea of the posible product and consequent advantage that may be derived from the culture of this most valuable esculent.

* We have seen an economy of this sort recommended in all the newspapers as a great improvement; which, I doubt not, has very much diminished the crops of such incautious individuals as trusted to it. It was recommended to cut off thin slices from the surface of the potatoe, with an eye in each, to be employed as sets, and the nucleus in the heart to be kept for food. It is scarcely posible to devise a direction that would with greater certainty insure a deficient crop.

One practical deduction may be made from the whole of this part of our investigation, that never ought to be lost sight of: it is, that no *absolute* reliance can be had on any experiments that shall be made on the culture of potatoes, unleſs where the person who makes the experiments begins, as one may say, *usque ab ovo*; that is, by raising the plants he is to employ as sets from the produce of one single stem, and multiplying them till he can obtain as many sets as answers the purpose he has in view. If this be not done, especially where the produce of a few individual plants are to be compared with each other, it may chance that an unprolific sort comes by accident to be compared with one that is naturally more prolific; so that the result may be the reverse of what it actually would have been, had the *kinds* been the same. Wherever this precaution has been omitted, the most accurate set of experiments can only be considered as leading to *probable* conclusions, which will be more or leſs uncertain in proportion to the smaller or greater number of plants that are taken as one aggregate.* At the time I made the set of experiments recorded in the Bath Transactions, the fact on which this conclusion is grounded was not known to me, so that the precaution it suggests was not attended to; but as it was made in Aberdeenshire, where new varieties of potatoes were at that time very little known, I have reason to believe

* I speak here only of those experiments that are conducted on a plan of distinct accuracy as to weight, measure, and other circumstances. As to the vague trials that are often made under the dignified title of *experiments*, they deserve to be reprobated as a political nuisance, that can have no other tendency than to keep error in fashion.

that the breed employed was very unmixed; and as the same experiment has been often repeated in kind, though not in degree, and without the scrupulous accuracy of an experiment, with the same general result, I have every reason to be satisfied with the justnefs of the conclusions there made.

Allow me farther to observe, that in cultivating potatoes the produce will be considerably affected by the nature of the stem they throw out, because this must on many occasions considerably influence the mode of culture, so that this particular never ought to be lost sight of in making a selection. The diversity in point of stems, or haulm as some call it, is much greater than most persons are aware of. Some produce stems extremely dwarfish, which rise nearly upright to the height of eight or nine inches only, while others produce a profusion of luxuriant stems that run along the surface of the ground in some measure like cucumbers for ten or twelve feet; nor is the produce below ground necefsarily connected in any way with the strength of the stem above; a dwarfish stem sometimes yielding a large produce, and the reverse. Luxuriant stems being, however, on many accounts inconvenient, these sorts ought in general to be avoided.

QUERE II. "*What is the best manure for potatoes?*"

I have not had an opportunity of trying such a diversity of manures as to enable me to give a direct answer to this querie. I shall therefore content myself with a few observations on this head, that are the result of the experience I have had.

It appears to me, that manure may tend to augment the produce of potatoes in two ways; and accordingly

as the one or the other is intended, the nature of the manure may be varied. The *first* is, where it tends to promote the general fertility of the soil, and consequently to add to the health and luxuriance of the *plant*. With this view all enriching manures that operate upon the soil more by their chemical than their mechanical qualities, are evidently beneficial; but their relative degree of excellence, as applied to this particular plant, I have had no opportunity to ascertain.

The intention of the second clafs of manures, as applied to the potatoe, is to render the soil in which the *bulbs are to be formed* as light and open as pofsible; which is found, by universal experience, greatly to augment the size of the bulb. In this case more reliance is had upon the *mechanical* operation of the substances employed as a drefsing, than on their *chemical* qualities. In this point of view, I have known many substances employed with good succefs by poor people to augment the produce of their potatoes, that could scarcely be deemed, in the usual sense of the word, manures at all: such as twigs of young trees, cuttings (clippings) of hedges, small bushes of broom and furze, runts of cabbages laid in the trench where the potatoes were planted, and then lightly covered up with earth. These substances, so little perishable in their own nature, remain very little altered during the time that the potatoes are growing; but by rendering the earth above the bulbs light and porous (for the loose earth insinuates itself among their small twigs) it forms a bed extremely favourable for the swelling of the bulb, which delights in a dry, light, crumbly

mould; whereas the *root* of the plant, properly so called, delights to strike into a firm rich loam, tending to clay, in which it thrives with amazing luxuriance.

From these facts I am satisfied, that in order to obtain a full crop of potatoes, the skilful cultivator must adopt a practice that shall be fitted to answer both of these intentions. Every one knows that the potatoes do not adhere to the *roots* of the plant, but to a particular set of fibres which push out from the bottom of the stem, which nature has provided for this very purpose, and which may be very properly discriminated by the name of *Umbilical* Fibres. These fibres generally push out in a horizontal direction, often rising a little upward,* while the *roots* of the plant, through which it sucks in the nourishment that sustains it, strike down into the soil below these fibres, where they branch out into various ramifications in search of food, as is common with most plants. The soil, therefore, that is fitted to sustain and to afford nourishment to the plant, and the bed in which the bulbs are to be deposited, are two things totally distinct from each other, that are connected merely by juxta position; each requiring to be poſseſsed of qualities different, and even opposite in some measure, to what would be required in the other: for the *potatoe-bed*; light, spungy, open friability are the qualities that seem to be the most indispensably neceſsary; a power to absorb and retain moisture in a moderate degree, without losing its adhesiveneſs and ponderosity, which

* It is potatoes having this quality that are now in general preferred for propagating; and it will be observed, that the culture, recommended above, is supposed to be adapted for this kind of potatoes only.

are the principal characteristics of what we call a *rich* soil, are by no means requisite for the upper bed; but it is these qualities that constitute the very eſsence of the bed in which the *absorbent roots* are to spread, and from which they are to draw the nourishment for the plant. The chief art in cultivating the potatoe consists in combining these two qualities together. Nor have I often seen it attempted in the way that is the most likely to effect these purposes in the most direct and speediest manner.

There can be no doubt but a firm rich loam, tending to clay, is that which is the best adapted for rearing the potatoe-*plant* to its full perfection in this country; and, under proper management, to resist the viciſsitudes of the weather, so as to insure its health the most effectually against accidents. But a lighter soil, under the usual management, is found to afford, in most seasons, a greater produce in *potatoes*, especially if the summer chances to be a little more than usually moist. When it is very dry, the case indeed is reversed. The sole defect of the heavy loam is the want of levity on its surface; and it is this superficial levity in the light loam that counterbalances its other radical defects. Enriching manures, such as well rotted dung (lime in most cases) decayed animal substances of any sort, &c.* will all tend to render both these kinds of soils more capable of encouraging the

* I wish to avoid all disputes about nice metaphysical distinctions respecting manures, which many people are very fond of. Without concerning myself with these, I must here be understood to mean, that a manure tends to *enrich* the soil when it tends to render that soil more prolific, and affords greater crops than it would otherwise have done, without inquiring into the *modus operandi*.

growth of the potatoe-*plant*; which is the first requisite for an abundant crop of bulbs: but to dispose it to *bear* kindly, lightneſs of surface must also be given. In this point of view, the propriety of employing *both* the kinds of manures, especially for the weighty soil, becomes apparent. The soil should, in the first place, be rendered *rich* to a sufficient depth, by means of enriching manures worked into it by repeated good ploughings. In this the *roots* would be able to strike with ease, and find abundant nourishment: but a surface-dreſsing should be given of the mechanical claſs of manures, which would give to the surface the spungy lightneſs that is so much wanted.* The best and readiest manure to be found of this kind that I know, is very rank new made stable dung, that consists chiefly of litter: and if it participates a little of the enriching quality from the dung, that will do no harm; for, by being washed down to the roots in summer, it will gradually promote the growth.

To obtain the *very fullest* crop of potatoes, upon this principle, from a firm loam, I should advise the enriching manure to be applied the preceding year to a crop of turnips, properly prepared and horse-hoed. In this case there is no danger of giving too much dung. Thirty good cart-loads of dung is as little as should ever be used: better if sixty can be spared. This ground to be ploughed to a good depth twice before planting the potatoes in the spring. After the

* It is very obvious, that were the *old* kidney white, which sometimes sent its bulbs to the depth of near two feet in a rich mellow soil, to be now cultivated, the rendering the surface lighter could be of very little service to it.

last ploughing let it be moderately harrowed, and laid out into breadths of three feet each, by drawing a furrow along every line, so as to mark the rows of potatoes. This furrow should not exceed two inches, or, at the most, three in depth at any place, and should be made with a plough that had a very flat sole, so as to make a wide shallow trench. In the middle of that trench the sets should be deposited, and above these should be laid the very rank (long) dung; which, if it can be had in quantity sufficient, should be laid about from three to six inches thick above the sets. A plough with a double mould board should then be pafsed along the intervals between the rows, so as to make a trench in the middle, and turn the earth lightly over the dung at each side: no matter though it does not cover it entirely; or indeed it will be better if it does not when the dunging is abundant. The ground in this state, being quite free from danger of being hurt by wet, may be left for a few weeks; but if masterly culture be intended, it ought to get a complete horse-hoeing, not in the usual way of turning the earth alternately to and from the middle of the *interval*, but to make it be turned alternately from *one row* to the other, and the next time reversed, so as to be laid back to the row from whence it was taken. [This mode of horse-hoeing was particularly described in the second volume of these Recreations, page 329, to which the reader is referred.] In this way, and in this alone, can the earth be *properly* loosened in horse-hoeing. These operations should be repeated once a fortnight, if the weather will permit, as long as the stems of the potatoes will admit the plough to be introduced. The

earth should be raised as high up to the stems as poſsible at the last hoeing; and better if it is at this time only that the dreſsing is completely covered, and the furrow be left very deep and clear in the middle between the two rows. In this way the *roots* have a deep bed of mellow friable earth to range in on both sides, which is in no danger of being drenched with too much moisture (the most destructive enemy of the potatoe), and the bulbs have full room to swell in a light spungy bed at top; which is all that is neceſsary to give them their full perfection.

It is almost unneceſsary to observe, that as soon as the potatoes show their stems above ground they ought to be carefully hand-hoed: an operation which, under this mode of management, is extremely easy; and that no weeds whatever should be suffered at any time to remain among the plants. Neither do I think it incumbent upon me here to enter into the minutiæ of the mode in which the different operations recommended may be best performed, as such directions appear to be here superfluous; but if the Board shall think otherwise, they shall be communicated when required. I have found it neceſsary to do this pretty fully towards the end. Neither do I think it neceſsary here to enter into a detail of the rotation of crops that would best suit the potatoe system in different circumstances; which, though a very important consideration, would be here misplaced. I shall only just observe, that where a *very masterly* culture is intended, potatoes do best to succeed graſs-land, if very rich; turnips where it is moderately so, or carrots where in fine order; and should be succeeded by wheat where the

land is not too rich for it. Where wheat dares not be ventured because of over-luxuriance, it may be either laid into grafs immediately after lifting the crop of *early* potatoes without a crop, or planted with greens, to be succeeded by carrots in the spring; these to be followed by early potatoes and grafs. But this is all upon the supposition that the culture is to be of the very best kind on a rich soil.

[*To be continued.*]

On the Origin of the Feudal Institutions, and their subsequent Modifications.

[*Continued from page* 57.]

In tracing the progrefs of society, and the developement of ideas which owed their origin to a change of circumstances that were for the most part unknown, and that gave rise to arrangements that were wholly unforseen, we shall get a glimpse of the natural expansion of the human powers, which, like the buds of an infant plant, though they discover from the beginning the vivid principle of life with its pleasing tendency to progrefsion, can serve to give no adequate idea of the nature or magnitude, the beauty or stability of the structure that nature has destined to erect upon these slender beginnings. As the naturalist finds great pleasure in marking the progrefs of a small seed from the first peep of the germinating bud to its final expansion into a magnificent tree, whose spreading branches continue for ages to be covered with an immense abundance of the most pleasing fruits, just so, and with an augmented sensation of delight, the beneficent inquirer is pleased to mark the progrefs of the political tree from

its first feeble beginnings, when it gave no indications of either length of days or robustneſs of constitution, until it gradually flings its aspiring arms over whole nations to give at the same time shade, protection, and sustenance, to millions of human beings, who, but for that salutary influence, must have perished and have been utterly unknown within the bounds of animated nature. It is by anticipating in some measure pleasure of this kind, that the reader may perhaps experience, that I shall be encouraged to proceed in trying to unveil the progreſs of the British constitution from its first slender beginnings, when it gave no indications of what it now is, through its various modifications till it aſsumes its present form: happy, if by attending to that progreſs, we shall be enabled to deduce any rules for our future conduct, that may tend to promote its vigour and insure its stability.

I wish to guard the reader from falling into one error respecting speculations on government, which has occasioned infinite perplexity to numerous inquirers; that is, never to lose sight of this undeniable truth, that governments owe their origin in general to *necessity* rather than to *choice*; and that the modifications they aſsume are rather occasioned by accident than the result of preconcerted design. By adverting to this maxim, we shall free ourselves from many embarraſsments with which speculative men have contrived to burthen such inquiries, and thus obtain a much clearer view of the subject than otherwise could be got.

Whoever wishes to obtain a correct idea of the origin of government need scarcely go farther than to observe the procedure of a parcel of boys at school.

Among these there is always some one who obtains a decided superiority over the others, and who has a ruling influence upon their conduct. This influence is not formally given to him either by common consent of others, or by his own requiring it. He himself has probably never once conceived any idea of the sort; far leſs has it entered into the minds of the others to think of such a thing. For the most part this boy is more quick in contriving sports or devising amusements, and more alert in putting them into practice than the others; they therefore look up to him whenever they are at a loſs, and without thinking of subjecting themselves to him, they voluntarily require his aſsistance, or he volunteers it, from the exuberance of his perceptions; they therefore naturally, and without any concert among them, become his dependants and imitators; he directs them what to do, and they readily follow his directions, unleſs there chances to be another who has nearly an equal claim to influence. Machiavel, in his life of *Castruccio Castracani*, has described, with his usual ability, the progreſs of this kind of influence in his boyish days, which laid the foundation of the future power of that celebrated adventurer; and it is by a similar progreſs that every man attains a superiority of power and influence among all rude and uncultivated nations; Jupiter, Pan, Apollo, Hercules, and all the gods and heroes of fabulous story, owed their apotheosis to a progreſs of the same sort among men in a state of society that did not admit of an accurate mode of estimating the power of talents; and it was by means of a similar sort that all authority has been originally acquired

among men. It was only after men were farther advanced in civilization, and were taught by experience the benefits they mutually derived by being subjected to authority, that they contrived to perpetuate governments, and to modify them in such a way as circumstances indicated to be neceſsary for best securing the good, and avoiding the evils that occasionally resulted from the exercise of power: and as in every community the circumstances that give occasion either for the benefits, or the reverse, that result from the exercise of power must vary according to the temper and dispositions of the parties concerned, and the incidents that occur, these must vary to infinity, and the means that will occur for moderating evils or improving benefits will be still more various; the modifications which human governments will aſsume must be varied, and continually changing, so as in the course of many ages, to aſsume an endleſs diversity, even though they should have set out from the very same point originally. Thus it happens, that although the original form of government in Britain, France, Spain, Germany, and every other country in Europe, were all so nearly the same as to exhibit only very small shades of difference in the early periods of their history; and though they only diverged from each other by gradual and almost imperceptible shades of difference at the beginning, yet they have long been so much diversified as scarcely to exhibit any other marks of a common origin than the remains of a few names that in letters are nearly the same, though in other respects they are totally different: insomuch, that while some of these governments have been gradually matured into the

most perfect form of freedom that hath ever prevailed among men, others have degenerated into the most complete despotism.

The feudal system, concerning the origin of which a general notion was given in the last Number of this work, was destined to effect great changes in the political situation of man on this globe; and among these changes, however unpopular it may sound in these days among a certain description of persons who call themselves philosophers, to speak well of it; yet we shall perhaps be forced to acknowledge, upon a careful examination, that it is to this source we must trace the only consistent idea of political freedom that was ever entertained by man; nor will the proofs of this position, if I mistake not, be difficult to adduce.

In taking a retrospective view of the history of nations, it seems to me, that all the governments that have hitherto appeared among men may be reduced to one or other of the three following sorts, viz. *Monarchy*, the simplest form of which is that in which both the legislative and executive departments are entrusted to one person; *republicanism*, or that in which both these kinds of power are lodged with the people; or *limited monarchy*, in which the executive department is entrusted to one person, and the legislative power is put into other hands; under which last form of government alone political freedom, in the true sense of the word, can ever be insured; and it was under the influence of the feudal system alone, that a consistent notion of this modification of power came to be entertained among mankind for the first time.

From the earliest records that have been transmitted

to us, it appears that the monarchical form of government alone universally prevailed. This was precisely according to nature; for nothing is so simple as this form of government; nor is it posfible that any other form of rule should ever be established among an uncorrupted people who have become so numerous as to stand in need of coercion to prevent individuals from infringing on the rights of others, or power to resist the encroachments of other bodies of men. The personal influence which some individual must neceſsarily acquire in consequence of superior powers will ever lead to this. This power will be conferred at first by silent acquiescence, and continued afterwards from the accumulating influence that habit ever effects among men. The evils that are found to result from the occasional suspension of this influence, naturally suggests the propriety of guarding against the extinction of that office which leads to the idea of hereditary power. Among a people, whose manners are simple, whose minds are pure, whose hearts are uncorrupted, the patriarchal or monarchical government is perhaps better calculated than any other to promote domestic comfort and national tranquillity. Such were the original monarchies of antient Asia, all of which were subjected to so few modifications, as to exhibit a clear proof of the simplicity of manners that then so universally prevailed in those regions: but when singleneſs of heart gives place to philosophical refinement, such unmodified power becomes inadequate for the purpose wanted, and another form of government must be substituted in its stead.

As societies increase vices begin to prevail, and

power generates abuse. Power then becomes the object of general cupidity; devices must be contrived for modifying that power; to discover how this may be done, arouses the most active energies of speculative men. The science of government becomes a study, the knowledge of which is the surest road to power. To forward these views, no art will be left untried by such men to render the poſseſsion of authority unstable. To this source must be attributed the origin of the *republican* form of government, and the never-ending exertions that have been made to render this the object of popular adulation. Its natural tendency, however, is to call off the attention of individuals from their own private concerns to that of intermeddling with the buſineſs of others; to make domestic comforts aſsume only a secondary rank in the scale of human enjoyment; to exchange a peaceful and secure tranquillity for turbulence and glare; and to give to brilliancy of talents that ascendency which virtuous integrity ought ever to poſseſs. As the true characteristic of such a government is instability in consequence of a never-ending series of intrigues, wars and revolutions, great scope is given for a brilliant display of talents among individuals. Cunning is named *wisdom*; ferocity *heroism*; and deeds which make the mind shudder with horror, acquire the name of *glory*. Under these circumstances, the turbulent machinations of a single year furnish a greater number of transactions for historical record, than could be afforded by whole ages spent in domestic peace, concord, and social harmony. Such, unfortunately for Europe, are the materials of which those histories are composed which

are put into the hands of youth to form their minds, and serve as patterns for imitation. Thus is the mind from its earliest infancy accustomed to the pursuit of a phantom instead of a reality, and we are all drawn aside from the paths of peace and comfort, to those of turbulence, warfare, and misrule.

After a series of struggles continued for many ages, and endless vicissitudes of power among conflicting states (the necessary and unavoidable consequences of the system above characterised) that part of the world which assumed to itself the name of *civilized*, having become so weakened by the wounds they mutually had inflicted upon each other as not to be able to resist the furious bravery of a set of *barbarous* invaders, as they have been called, were compelled to yield to their power, and to submit to a new arrangement of things; which, setting speculation aside, established a government which adapted itself, without any preconceived notion on the subject, that was suited to the real state in which the persons who were to govern found themselves placed. By following this procedure they have been at length led imperceptibly to discover a system of government, which, if not better calculated than the patriarchal rule to cherish simplicity of manners and domestic comforts, is at least more happily adapted to the correction of abuses that are the result of a refinement of manners than had ever before entered into the mind of man to conceive. This discovery consisted in the separation of the executive from the legislative departments of government; a refinement in politics which grew out of the feudal system without any preconceived notion either of its beneficial or hurtful ten-

dencies. These refinements came to be perceived only after their effects were experienced, and varied from each other in respect to the quantum of these tendencies according as circumstances concurred to forward or to check their developement. It will be fortunate if we shall be able to give any thing like a precise idea of the circumstances that have tended to produce those salutary modifications that have served to confer upon the constitution of Great Britain that marked superiority which it so decidedly now poſseſses above those of other states which commenced their political career at the same period with herself, under the influence of the same circumstances that then affected her.

I aſsume it then as an admitted fact, that the feudal system was established universally in Europe in all those kingdoms that were successively subjected to the sway of those northern invaders who established themselves upon the ruins of the Roman empire; and that this system was then so nearly the same as to exhibit no perceptible differential feature in any case. The territorial property, as we have said, was in general divided into allotments, which were distributed into portions of greater or smaller extent, according to the proweſs or influence that the character of each chieftain bore among his peers, under the condition of military tenure as above explained; each chieftain being by that tenure bound to serve in the field, not only by himself when summoned for that purpose by the king, but also to bring along with him, under his own standard, a number of his inferiors, or, as they were then denominated, *vassals*, in proportion to the extent of his territories. With this view, he was authorised

to divide his portion into smaller shares among his vaſsals, who, in return, became bound to furnish certain services, which were authorised by the custom of the times, to their liege lord; among which that of serving in the armies under his particular command, was the principal. These feudal lords, who held their lands immediately from the crown, and their retainers, who held by a subordinate tenure from these lords, constituted the whole military force of the kingdom. They were, in short, the whole of the army of the conquerors; and were the only perſons who were accounted worthy of being entrusted with arms of any sort, or were at all entitled to the name of free-men. All other persons in the nation, that is to say, the whole original inhabitants of the country (with a few exceptions to be afterwards noticed) were accounted slaves, and were transferred along with the lands which they inhabited to the persons to whom the different territorial allotments were aſsigned. These persons, forming, as we may suppose, by far the greater number, were neceſsarily deprived of the privilege of bearing arms of any sort, and were subjected to the will of their lord, to be employed at his pleasure, for performing those menial services he might want. They were, therefore, accounted as nothing in the political system of those times, and as little superior to cattle or other beasts of burden.

From this view of the subject it appears, that under this system during peace, the sovereign was authorised to execute the laws that had been enacted by common consent throughout the whole extent of the territories of the state, in as far as respected the public

tranquillity, whether originating from foreign enemies or domestic discontents; and that each of the feudal lords had the charge of regulating his own domains in as far as affected their particular concerns in a manner nearly similar to that exercised by the sovereign over the whole kingdom; the regulations affecting the subvaſsals being similar in kind to those affecting the chiefs, and only confined to a narrower circle in their sphere of operations.

For the purpose of devising general rules (afterwards called laws) to preserve the stability of the state, general councils were held from time to time, as exigencies might require, which were summoned by the king to meet at the time when, and the place where, he should think would be the most convenient. At these councils the king himself in general presided; and having propounded the buſineſs for which they were called together, the members consulted together on any other subject affecting the commonweal that they saw proper, and made such regulations as were approved of by the will of the majority present. To this aſsembly all who held lands of the crown, and who were generally known by the name tenants in *capité* were summoned, and had a right to attend, having an equal voice in all deliberations, nor were any others entitled to enter this aſsembly. Such was the origin of that aſsembly, which, after having aſsumed a variety of names, came at last to be known by that of *parliament* in Great Britain; the progreſsive changes of which, and the various modifications it aſsumed under different circumstances, I shall take occasion to trace in some future Numbers of this work.

I shall only take occasion at present to remark that at the period to which our present remarks apply, the people of every nation in Europe consisted of the following claſses:

1st, *Villains.* These were slaves, and were transferred with the lands to which they belonged, from which they were on no account at liberty to depart without permiſsion from their lord. They had no deliberative voice in any thing that affected the state either in a primary or subordinate capacity, nor were permitted to carry arms.

2d, *Ceorls,* or husbandmen. These persons were of a rank superior to the former, being entitled to receive as a gratuity for their labour and exertions, a certain proportion of the produce of the lands they cultivated. This order of men seems to have arisen from among the *villains* by a selection at first for the sake of convenience. Their condition was imperceptibly ameliorated by a gradual relaxation of severities, so that at no two periods of time were they exactly the same. These persons also were incapable of bearing arms.

3d, *Vassals,* or subtenants. These were free men, who held lands from subjects superior as their liege-lord, to whom they were bound to pay suit and services according to the customs of the lordship. They exercised a deliberative voice in the courts or aſsemblies of their liege lord, but not in the supreme council of the nation, and were capable of bearing arms under the banner of their liege lord. As no territorial property could be transferred from one subject to another, whatever their rank might respectively be, without the owner of it being subjected to this form of te-

nure; it often happened that a tenant in *capite* became thus the vaſsal of another of an inferior degree to himself, for so much of the lands as he thus held. But to avoid this it was afterwards contrived, rather to resign the lands, thus given, into the hands of the crown, who gave a new grant of them to the person who had obtained a right to them: such surrenders are not entirely unknown even at the present day.

3d, *Tenants in Capite.* These were the *magnates*, or nobility of former times; who were distinguished by many titles in future ages, the greatest of which, in the earliest periods, was that of Thane. These were deemed the counsellors of the king, and had all a voice in the *concilium commune*, or great council of the nation. The changes which gradually took place respecting this order of men, will also be slightly noticed in our future descriptions.

Some account of the principle of the new patent hot-houses, in as far as respects the forwarding the ripening of grapes and other fruits by the heat of the sun alone.

FROM the hints that have been given on this subject in the preceding volumes of this work, those readers who have taken it in from the beginning will have formed general notions concerning the tendency of the improvements proposed, so that, in regard to them, it might be unneceſsary to take any notice of the physical qualities of the atmosphere, on the knowledge of which the whole of these improvements are founded:

for the sake of others, a very brief recapitulation of these principles will be sufficient.

The air, of which the atmosphere that surrounds our globe chiefly consists, is a fluid body, which, like all others, has a continual tendency to preſs towards the centre of the earth, and to compreſs every body with which it comes into contact in every direction, with a power proportioned to its depth and density at the time, in consequence of which it forces itself into the crannies and fiſsures of solid bodies wherever these are of a size sufficient to admit it, and, under these circumstances, equally pervades the whole. Hence it happens, that the inside of every building that has openings into it, and of every pervious veſsel, sustains an equal preſsure from the weight of the atmosphere as the outside of it.

But this is not the case with regard to veſsels that are impervious to air; for, in that case, the preſsure either inward or outward may be made to vary in all poſsible degrees, as circumstances may be changed. If the air, for example, shall be pumped out from the inside of the receiver of an air pump, all the junctures of that receiver being made previously air-tight for that purpose, in proportion as that air is drawn off, the preſsure of that upon the sides of the veſsel from within outward being diminished, the weight from without preponderates, and the receiver is preſsed to the table on which it is placed with a force proportioned to the degree of exhaustation it sustains, so that it cannot be removed from its stand. In this case the air acts merely as a gravitating fluid, as water would do under the same circumstances. Were a veſsel filled

with atmospheric air, and closely stopped, placed in the inside of the receiver of an air pump, and the air in that receiver drawn off, there would then be a preſsure from the inside of the smaller containing veſsel tending to burst it, exactly similar to that which is experienced in a veſsel containing water placed in the open air, so that the contained denser fluid would run out of either veſsel were a hole made into it sufficient to allow it to escape. Both air and water, under these circumstances, act alike as mere gravitating fluids at all times on every part of the globe.

But besides the quality that air poſseſses as a gravitating fluid, in consequence of which it produces powerful effects in nature, it poſseſses other qualities, in consequence of which the sphere of its influence is prodigiously extended; of these qualities its elasticity and expansibility by heat are the only ones that are of much importance to be adverted to upon the present occasion.

That any portion of air may be made to occupy a smaller space, in consequence of an increased degree of mechanical preſsure upon it, is well known by thousands of experiments, which are of such universal notoriety as to require no particular illustration in this place; and, when it is so compreſsed, it is equally well known that it has a continued reaction, or a tendency to expand and occupy its former bulk. This reactive tendency is called elasticity. The air-gun, the forcing-pump, the fire-engine, bellows, and many other implements of great utility, owe their power entirely to this principle; concerning which it is not neceſsary we should here enlarge.

The expansibility of air by means of heat is of all its qualities that to which it most behoves us to advert on the present occasion, because it is the modifications of which it is susceptible in consequence of this quality, conjoined with that of its gravitating power, that will enable us to effect the improvements which constitute the sole merit of this invention; and which, when duly adverted to, will be found to be equally simple, efficacious, and obvious to every person who is in the smallest degree acquainted with the universally acknowledged laws of pneumatics.

If the rays of the sun be admitted to pafs through any diaphanous (transparent) substance that is impervious to air, and to act upon any solid opaque body within it, the body so acted upon will be heated, and in consequence of the reverberation from it, that portion of air which is contiguous to it will be instantly heated by it also. What is the consequence of this? That portion of air which is so heated expands so as to afsume a much greater bulk than it formerly occupied; and as, in consequence of that expansion it becomes specifically lighter than before, it must of necefsity rise upwards (for it is an invariable law of nature, that among fluids the lighter will always afsume the highest place, as oil upon water), and thus be carried off into the higher regions of the atmosphere, unlefs it shall be stopped in its course; the weighty, because cold air below, being prefsed into the place thus left vacant by its escape in consequence of its gravitating power. So long as the sun continues to act, there must therefore be established a continued stream of particles of heated air rising upwards, and a

succeſsion of cooler particles of air preſsing towards the heated body to supply its place, as is made obvious to the senses by the ascent of smoke from burning bodies universally. This rule is invariable.

Let us now look into a common hot-house, and observe what are the consequences that must result from this law of nature. No sooner does the sun begin to shine through the glaſs than a quantity of air begins to be heated, and consequently to rise upwards from the place where it was first expanded; but, unleſs the glaſses be then closed above, it communicates only a very small portion of its heat to the air it encounters in its ascent (for air is a bad conductor of heat, in the proper sense of that word, as the experiments of count Rumford show); but, as it instantly ascends into the higher regions, the sun must continue to act for a very long time indeed before it can produce any sensible effect upon the plants placed in the inside of the house for the purpose of being cherished by that heat. The pernicious effects that result from the removal of the top glaſses during the night time are indeed so obvious, that the practice of keeping them then closed has long been universal; although, from the way in which it has been done, it is very evident that the manner in which the agents of nature operate in this case have not been adverted to, in consequence of which they have been suffered to elude our power. In order to remove these prejudices, then, they must first be detected.

Men, in general, consider a hot-house merely as an inclosure, containing a quantity of matter heated to a certain degree, which is surrounded by a medium which

is in general colder than itself; and that, of course, there is a perpetual tendency in the colder surrounding medium to abstract the heat from the leſser heated object contained in it, so as to make the heat in both to aſsume an equilibrium; and that all the heat which it is neceſsary to convey to the leſser body to preserve its temperature is merely with a view to supply the want of that which is *thus* abstracted from it. The hot-house is, in short, considered to be nearly in the same circumstances as that of a bottle containing heated water, which is immersed in a large reservoir of colder water near the freezing point, and which has a never-failing tendency to cool the water in the bottle; an effect which it must infallibly produce in a given time, without any intermixture of the two fluids, unleſs some means can be devised for supplying, by some extraneous means, to the water contained in the bottle, continual acceſsions of heat, in proportion as it is thus transmitted. That this is the common opinion of men who are concerned in every buſineſs of this kind, will not be denied by any candid person; or should it be denied, their practice will betray the fallacy in spite of themselves. That they have been here under a great mistake, the following remarks will clearly show; but the exact amount of the loſs they have incurred through this mistake must be left for experience to ascertain. It will soon be found to be *much* greater than would be believed without the corroborating aid of experience to support it, however clear the evidence might be made.

Were the *roof* glaſses of a hot-house to be made wholly impervious to air, it is obvious, from what has

been already said, that the particles of heated air which are rarefied by the first rays of the morning sun, instead of paſsing off as fast as they are generated, would be neceſsarily detained in the higher part of the house, where they would quickly accumulate in such quantity, as to render that part of the house very hot, long before any sensible change could be experienced in the lower part of the house. In consequence of this neceſsary arrangement, it must in this case invariably happen, that such bunches of fruit as are nearest the upper apex of the roof would be sooner ripe than those below. This must, in the case supposed, be strikingly obvious. Even under the management at present adopted, it is impoſsible to prevent it from being observable, as every man who has had the management of a vinery must know. But I beg the attention of the reader while I point out a few of the circumstances that tend in *a most* powerful manner, under the present practice, to annihilate, if it were poſsible, the effect of this influence.

The roof glaſses of hot-houses are almost universally laid into the frames by lapping one pane over the other, thus leaving an open space between each pane through which the air is allowed freely to paſs and repaſs at all times, while the panes in the front are closely puttied all round. I beg that this last circumstance may not be overlooked; as I shall have occasion soon to take notice of some important consequences that result from this circumstance, and which have been wholly overlooked.

In consequence of the numerous openings that are thus left *in the upper glasses,* the heat which is generated by the morning sun, at first in moderate quan-

tities, is suffered for many hours to escape as fast as it arrives, and thus to prove in no degree whatever beneficial to the plants within. It is only when the sun gets high, and acts with great power, that the acceſsion of heated air becomes so great as not to be permitted to escape so fast as it is generated; after which time only the sun's heat becomes sensibly perceptible within the house. If the sun, even while in its meridian splendour, be overclouded for one hour only, the whole of the heated air that had been accumulated in the house has time to make its escape, and the temperature within becomes equal to that without doors. The same observation applies in a yet stronger degree after sun-set. The feeble heat that can be generated by the evening rays has been, indeed, suffered for some time to escape as fast as it was produced; so that the glaſs, in this case, does little more than guard against the effects of wind; and in all other respects the inside of the house, where no artificial heat is kept up during the night, must be nearly the same as that without doors.

Not only are the precautions that have hitherto been adopted for preserving the temperature of hot-houses during the night time (the heat arising from burning fuel excepted) nugatory; but in most cases they actually prove prejudicial; so as to produce in a certain degree the same effect that would be produced by laying the plants in the house open to the influence of wind; with this single exception, that the effect, though more certain and steady, is leſs violent than that of a strong gust of wind might be. In proof of this, it is only neceſsary to advert to the following particulars:

When the evening approaches, not only are the *top* glaſses closed, but the upright sashes and doors are all shut as close as they can be made; under the notion, that the cold will thus be the more effectually excluded from the building in every part: but observe what is the neceſsary consequence of these precautions.

No sooner has the sun withdrawn, than the temperature of the air is changed; and as the heated air that was within the house quickly makes its escape in the manner that has been already shown, the air within the house soon participates of the temperature of that without; it becomes colder than it was; of course, it contracts greatly, so as to occupy much leſs space than it did before. To supply the vacuum thus occasioned, air must be drawn in from without; but, all the apertures below being now closed, the supply of air that is wanted can only find admiſsion through the openings that are left between the panes of the *roof glasses*. Through these crannies then is now established a current of cool air, which continues to pour into the house through the whole of the night (being directly the reverse of the current of heated air throughout the day), and falls in streams to the floor, so as to cool the whole house universally in the quickest and most effectual manner that could be devised; whereas, had these higher apertures been closed, and some opening left below, the supply of air wanted to make up for the neceſsary condensation would have flowed in below; and this air, being cooler, and consequently more weighty than that within, would have kept its station upon the floor, without affecting the general temperature of the house above.

In consequence of all these unobserved effects of the neceſsary movements of the air, the agency of the sun has been hitherto of little avail in maturating fruits under glaſs in this country. During our hottest weather, indeed, the sun does operate so powerfully as to render it neceſsary to make a provision for suffering the heated air then to escape: and even this department has been so managed, as to be frequently the cause of disorders that are well known to practical gardeners, but which it would be painful here to dwell upon, farther than to observe, that in a well constructed house, it is as neceſsary to guard against a temporary exceſs of heat, which will frequently occur where no fire is used, as against an exceſs of cold, which, under the present system of management, can only be obtained by the consumption of fuel; and which can in general be much more completely effected by the agency of the sun alone. How this may be easily done I now proceed to state, after having only remarked as one instance of attention in Mr. Stewart (a skilful and very attentive gardener at Woodlands, Blackheath) that he, as he aſsured me when I first explained this matter to him, had observed the evil tendency of the openings in the roof glaſs, and had taken measures to obviate it (though differing greatly from those below specified), the good effects of which he had experienced.

It will appear obvious from what has been already said, that if the roof of the hot-house, instead of being sloped upwards, as at present, were laid over the whole in a horizontal position, like the ceiling of a room, and if this roof were made of glaſs so joined together

as to be air-tight, the following effects would result from it—the reader being desired, for the present, to take no thought of the effect of rain, or any other extraneous circumstance, upon this horizontal glaſs, all of which will be afterwards provided for.

The first particles of heated air that were generated in the morning by the rays of the sun, instead of flying off into the atmosphere, and being there lost, would be stopped by the glaſs, and would there be diffused in an equal stratum of heated air under the glaſs, the depth of which stratum would become greater by the addition of every succeſsive particle as it aróse; so that, if none of it were allowed to escape at the sides, or otherwise, the depth of this stratum must gradually increase until it filled the whole house; the temperature being always warmest immediately under the glaſs, and colder as it receded from it in a regular progreſsion. All this is so obvious as to require no particular illustration.

2nd. If an opening of a sufficient size were made any where in the side wall, or otherwise, so as to communicate with the open air, the stratum of heated air would no sooner reach to the level of that opening than it would make its escape through it into the open air, and under these circumstances the stratum of heated air could not reach lower than that opening. In this case the stratum of heated air would bear an exact resemblance (only reversed) to a stratum of water accumulated in the bottom of a veſsel, into which it flowed until it rose to the height of an opening in that veſsel, through which it could run off without interruption. Of course, if this opening could be made

at pleasure, either immediately under the glaſs, so as to allow the whole of it to fly off, or at different heights till it came near the bottom, the depth of that stratum of heated air could be made more or leſs shallow as should be judged proper, so as to admit of the heat being moderated at pleasure.

3d. If vines or other fruits should be trained horizontally immediately under the glaſs, these vines would receive the benefit of the whole heat communicated by the sun the moment that its influence was exerted; and, should the sun be afterwards over clouded, the heat would not be then withdrawn from them, but they would continue to be benefited by its benign influence long after the sun was so withdrawn. And if the stratum of heated air should be made to extend much deeper than the grapes reached, though it would neceſsarily contract during the night, yet if the air to compensate for that contraction be suffered to enter from below, the cold air thus admitted will there remain, without affecting the temperature of the higher region of the house, in which alone the fruits that require the greatest heat are to be placed.

4th. If the heated air, generated by the continued action of the sun, whenever it became greater than was wanted in the house, instead of being thrown out and diſsipated in the open air, were drawn off into a reservoir provided for that purpose, where it could be retained until it were wanted in the house; and if that heated air could be brought back into the house in proportion as the cold contracted the air within it; it is obvious, that the heat in that house could never be suffered to diminish, even in the absence of the sun,

until the whole of the heated air should be drawn off from the reservoir; so that, if the reservoir be made of a sufficient size, the heat may be continued in the house undiminished, not for one night only, but for a week, or even perhaps for a month together, without any fresh accefsions of heat; so that, in as far as refpects temperature only, no evil could be experienced from a continuance even of cold and cloudy weather, while every hour of sunshine that shall be experienced will add to our stores to be laid up in reserve: and,

Lastly, should we have it in our power to agitate the air within the house at pleasure, so as to mix the hot particles and cold together, and thus to moderate the heat upon the plants on the approach of evening, for the purpose of allowing it afterwards to ascend as the coolnefs of the night approached, we might thus not only preserve the beneficial effects of the heat without experiencing any thing pernicious, but carry off damp even in the most ungenial seasons, and give to the plants, by a sufficient degree of agitation of air, without neceefsarily diminishing its temperature, that steady health and firm temperament which they enjoy in the open air.

These are the principles upon which our improvements are founded. They are clear and unequivocal; but as the effects which will result from the application of these principles in practice will be so much greater than men who have been in the custom of managing hot-houses on the principles usually acted upon will be prepared to expect, I find it neceefsary, before I proceed to state the amount of these effects, to call the attention of the reader to the following cir-

cumstances, by adverting to which he will be prepared to consider the statements which it will be found neceſsary to give, as leſs exaggerated than they otherwise must appear to him to have been; for I am well aware, that no one who does not advert to these circumstances, could believe it *possible* that such great effects could result from alterations seemingly so trivial as those above stated. Experiments at large will soon prove the truth of the positions; at present we can only make an approximation towards demonstration by an appeal to a few facts that every person has it in his power easily to ascertain upon a small scale; which, though they must prove greatly deficient in regard to *quantum* of effect, cannot fail of being unanswerably decisive as to the tendency of it.

If a cylindrical glaſs tube, or a jar, open alike at top and bottom, be placed in the sunshine, having a cover that is easily pervious to air lightly laid over it, it will be found that the air within that tube can be made to attain but a very small degree of heat beyond that of the external air which surrounds it; and that, in a few minutes after the sun ceases to act upon it, the air within it will have attained precisely the same degree of temperature as that without; the weather being supposed to be calm at the time.

If a cylindrical vase of the same dimensions, closed at bottom, but being open at top, be placed on its bottom in the same circumstances, the case will be little different. The heat may be a small degree greater towards the *bottom* while the sun continues to act; but the sun has no sooner withdrawn than it comes to nearly the same temperature with the external air

in all respects. This gives an exact representation of the effects produced by the sun upon a hot-house on the present construction.

Take another cylindrical vase of the same size and form with the latter, and place that also in the sunshine beside the former, only with its bottom upward; and it will be found, that, in the space of a very few minutes, the heat within that cylindrical jar much exceeds that of the air on the outside of the jar, especially toward the top; and that the disproportion between the degree of heat of the external and internal air goes on to augment in proportion to the length of time the sun continues to act upon them: but this difference between the external and internal heat becomes more evident after the sun ceases to act upon them. The heat without suffers a sensible abatement the moment after the sun is withdrawn, while that within continues to retain nearly the same temperature for many hours after. This may give some idea, though a very inadequate one, of the state of the hot-house upon the improved plan.

I call it a very *inadequate* idea of the effects of it, for this plain reason (without even adverting to the effects of the auxiliary chamber and other circumstances above stated); that, whereas the cylindrical jar contains only (we shall suppose) *one* cubical foot of air, exposed to the influence of a cold surrounding medium, under a surface (say) of 36 square inches, it must thus be liable to be much more quickly pervaded by that cooling influence through all its parts, than would be a body of 6000 cubic feet of air (the size of a moderate hot-house) exposed to the influence of the same cooling medium under a surface of 1000 square feet (about

the average proportion); for, in the first case, the surface is to the solid contents as 6 is to 1; whereas in the other case it is only as 1 to 6. Whence it follows, that if in the first instance, six hours would elapse before the inside of the jar assumed the same temperature with the external air, in the last instance it would require 216 hours before it could thus be brought to the same temperature. This I state merely as illustrative; for I do not say that the air in the jar will not assume the temperature of the external air in less than six hours (though from the trials I have made, I am satisfied, that with the supplemental aids above enumerated, it will require longer time to assume that temperature immediately below the *top glass*; far less do I say, that any house could be made as close as the inside of a jar of glass; yet, making ample allowance for unavoidable inaccuracies in workmanship, it will not, perhaps, appear inconceivable to any considerate person, who adverts sufficiently to the circumstances above stated, that, instead of retaining its heat for 216 hours, it should do so for one tenth part of that time, which is twenty-one hours; so that there would be little difficulty in thus continuing an equal degree of temperature throughout the whole season, night as well as day, if it should be deemed proper or necessary.

Were we to rely upon the experiment of the inverted jar only, it would seem probable, that a very short course of sun-shine, even when the sun reaches only his lowest degree of elevation in winter, would produce a heat sufficient to promote the growth of the vine at any season of the year throughout the whole

course of the twenty-four hours; but this I do not pretend to say could actually be done even in the best constructed houses (though I confeſs I do not see at preſent any valid reason for thinking it impoſsible); but it is very evident, that if any artificial heat at all can ever be wanted for this purpose, this artificial aid will be but very little indeed. And I shall have occasion to show, in the course of these eſsays, in what manner that small degree of artificial heat, if ever it should be at all wanted, may be obtained in the most commodious manner, and at a trifling expence in every poſsible situation. I shall at the same time have occasion to show, that there are other circumstances which tend to affect hot-houses on the present construction, that must accelerate the diminution of heat in them much more than could take place were they precisely under the same predicament with the jar above described; and which, by having been never adverted to, have rendered the aid of artificial heat indispensable in innumerable cases, that, under the management now proposed, will be entirely unneceſsary. These circumstances, together with the management of artificial heat, will be developed in the future Numbers of this work. In the mean while, it is neceſsary to request that the reader will suspend his final judgment concerning it till all the particulars shall be fully explained. I shall only add to the length of this paper by stating the following circumstance, which will clearly show that the principle I have acted upon has been in part recognised in *practice* by some attentive gardeners, though they have not been able to discover the philosophical principle on which the benefits they

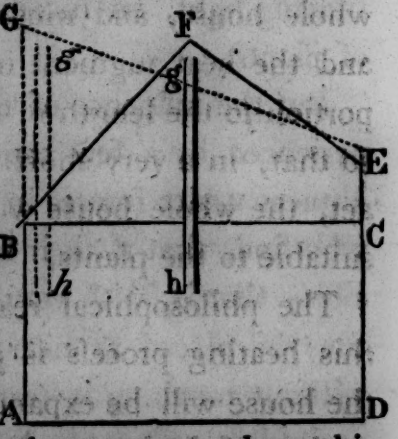
have in certain cases derived from it were founded; and, consequently, have only derived a partial, instead of a general benefit from it.

Every man who has had the management of a stove knows, that a low house, with a roof very little sloped, is warmer, in general, than one that is higher, with a steeper pitched roof glaſs. This is alone to be attributed to the circumstance of the plants being placed in the warmer medium, which must ever be experienced in the higher part of the house, *when the heat from below is brought in* quicker succeſsion than it can flow off from above through the crannies between the glaſs; of course, the effect will be augmented by covering the glaſses during the night time with mats or otherwise. This effect, however, is diminished by the removal of these mats during the day time, for the purpose of admitting light, an indispensable article for the health of plants.

But the influence of this principle is more fully experienced by a few cautious observers in forwarding lettuces under frames in winter without artificial heat; who find, that if their frames be placed as flat as poſsible; that is, with very little rise behind, and the lettuce be placed as near to the glaſs as can be done without touching it (especially if the frame be sashed or leaded, so as to admit little air) the lettuces advance much more rapidly than where they are placed far below the glaſs. This is a secret that is not known to every gardener, and that gives, of course, to one a very unaccountable advantage over another in certain respects, which is often ascribed to soil and warmth of local situation. The principle, however, of this

practical improvement is obvious, and no good reason can be given why it should not be universally applied. All the other improvements that I shall propose, are in like manner consistent with the practice of attentive gardeners who have had a sufficient degree of experience, and consist in nothing more than the simplifying, generalising, and thus improving these their beneficial practices. Nor have I any hesitation in saying, that it is practical men who will be best able to perceive and to make the truest estimate of the value of these improvements.

In conformity then with these principles, I propose, that a house calculated for the purpose of forcing vines, or other fruits that require a similar temperature, should be constructed on the following plan. Let A B represent the perpendicular front glaſses; B C the horizontal roof-glaſs; and C D the north side of the house, which ought also to be of glaſs, unleſs imperious circumstances prevent it. The east and west ends should be also of glaſs; for nothing is of so much consequence to the health of plants as light; so that on that account, were it on none other, this arrangement ought to be adopted: but when it is also adverted to, that the first peep of the morning sun will, at every season of the year, produce its influence in raising the *heat* within the house, and the last ray of the evening sun tends to prolong that effect, the benefits to be derived from it will become still more apparent.



Observe, that it is a circumstance of indispensable neceſsity, that all the glaſses in this house be made quite close; so that the joinings between each pane must be closed with lead and putty; and as the glaſses, especially those above, never require to be taken off, these ought to be screwed firm to the under side of the joists, and the joinings closed with putty, or covered with paper neatly pasted over them.

Under these circumstances, the sun no sooner acts upon the floor A D within the house, than it heats air there, which immediately rises upwards till it is intercepted by the flat roof B C, where it instantly forms a stratum of heated air of an equal degree of depth along the whole length of that line from side to side. This stratum, if the roof-glaſs be placed perfectly horizontal, must be of equal thickneſs over the whole house, and must gradually increase in depth, and the heat augment in intensity at the top, in proportion to the length of time the sun continues to act; so that, in a very short while after the sun begins to act, the whole house will be made as hot as can be suitable to the plants.

The philosophical reader will perceive, that while this heating proceſs is going forward, the air within the house will be expanding in a proportional degree; so that, if the house were made close every where, the glaſses would be infallibly burst outward, were no means adopted for preventing it. To guard against this evil, and to answer other beneficial purposes that will be afterwards specified, let a roof, B F E C (better of the form B G g E C) be thrown over the flat glaſs ceiling B C. The line B F or B G fronts the

south, G E and F E C look towards the north, the part from C to E being perpendicular. The whole of this roof will be best made of glass, and closely puttied every where. But if any one shall think it better to have the northern part, F E C, made of slate, or other solid material, it may be so; only it must be close plastered on the inside, and the roof pitched higher, as at B F E C, for the purpose of lessening the shade of the roof in the house, than if it be made of glass, when it may assume the form of B G g E C. All along, where the roof glass joins the perpendicular glass at B or C, a small opening should be left to admit free access to the air. Free access should be also allowed to the air to pass and repass between the lower chamber and that above, through the open tube h g, or *h g*.

The house being thus constructed, no sooner will the expansion of the air be felt in the lower chamber, than a part of that air will be forced to pass through the open tube *g h* into the higher chamber; and that heated air will in its turn force out some of the air already in the higher apartment by the opening at B or C. The air that is thus forced upwards will be at the first only cool air; but as soon as the stratum of heated air in the lower chamber reaches as far downwards as the lower mouth of the tube *h*, heated air will then begin to rise upwards through the pipe; and this heated air, being lighter than that already in the upper chamber, will necessarily take its station in the higher part of that chamber towards F or G; while a portion of the *coldest* air in that chamber will be forced out at B or C to make room for it. In this manner will be established a constant stream of heated air from the lower to the higher chamber during the whole time

that the sun continues to act upon the house, and consequently to heat the air within it; and in this way also the hurtful effects of its expansion in the lower chamber will be obviated.

During the whole continuance of this heating process, the vines, which you will please to suppose are spread all along under the roof glass B C, will be immersed in the stratum of heated air, while the sun, acting freely upon the vines through that glass from above, will contribute to give them the highest degree of health and vigour of which the plant is susceptible. The grapes then will be forced forward *during the day-time* with as great rapidity as the nature of the plant can admit of; for there can be no doubt but two hours sunshine at any time will give to the stratum of air in which the vines are laid, the full degree of heat that is necessary for the healthy state of that plant; and every minute that the sun continues longer to act will be laying up a store of heated air to keep up the temperature of the house nearly to the same degree during the absence of the sun *in the night, or from the intervention of clouds, fog, or any other cause.*

To understand in what manner this effect is to be produced, the reader will please to take notice, that whenever the influence of the sun is withdrawn, a process directly the reverse of what has been just described, must be commenced; that is to say, the air which had been heated, and consequently expanded, by the sun, will begin to cool, and of course to contract within the house, so as to occupy less space than before. To supply the vacuum thus occasioned, air

must be introduced from without; but if the door and windows in the lower chamber be all shut quite close, the only channel through which air can be introduced into the hot-house will be through the open pipe *g h*; but, as the mouth of the pipe *g* opens into the warmest stratum of air only, it is that *heated* air alone that can be drawn into it from above; so that, as long as any heated air remains in the upper reservoir, little or no abatement of the heat can be experienced in the lower chamber; for, in proportion as the heated air is drawn from the upper chamber into the lower one through the pipe *g h*, cold air will flow into the lower part of it through the opening at B or C; and this cool air, by its superior gravity, must keep its station in the lower part of that chamber, so as very slowly to reach to the top of the pipe *g*; but, until that cold air reaches this point, the heat in the upper part of the lower chamber can suffer no sensible abatement.

How long time it would take to bring the air immediately under the glafs B C to the same temperature with the open air, supposing the influence of the sun to be wholly withdrawn, after both the chambers had been raised to the heat, say, of 80 degrees on Fahrenheit's thermometer, it is impofsible to say; because that will vary with the temperature of the external air, the size of the house, and several other circumstances; but, from the imperfect trials I have made, it seems to me highly probable, that were the external air about the 40th degree, and the house 30 feet long or upwards, it could not be cooled nearly to that degree in the space of twenty-four hours (probably not in the course of one week); and as it has been already stated,

that a few hours sunshine will be sufficient to heat the house completely, there seems to be little reason to apprehend that vines might not thus be forced, so as to ripen as early as the month perhaps of April or May in this climate, even without any artificial heat whatever; or if any artificial heat at all would be wanted, it could only be in consequence of a peculiar coincidence of circumstances in an unfavourable season; and then it could be wanted only at particular times, and in small quantities. But, should any doubt be entertained of the posſibility of ripening grapes thus early without any artificial heat at all, there can be no doubt that, under this management, grapes could be thus ripened in every season as early as the months of June, July, and August, without any aid whatever from artificial heat. This position, I am aware, many sensible men, who have had extensive *practice* in this line of buſineſs, will have difficulty to admit: nor do I wish that they should do so till they see the fact proved undeniably by *experience*; for it is not upon *reasoning* alone that *such* men ought ever implicitly to rely. They ought at least to suspend their judgment for the present until all the particulars be fully explained; for these men will easily perceive, that were not some obvious difficulties that must occur in practice, to be removed, no plant could long live in the situation above described. When the means proposed for obviating those difficulties are stated, they will then be better enabled to judge than now. All that is at present in view is, to show that *heat* enough for the purpose wanted can be obtained.

Neither ought those who are more familiar with

physical experiments, to rely too implicitly on the above statement, as conclusive respecting the practicability of the thing proposed. For the maturation of fruits and the healthy growth of plants, it is not enough that abundance of heat be within our power: that heat may become destructive. It is only under a judicious management that it can prove salutary; and what that management is requires to be explained; and will be explained in due time.

In the mean while, it may not be improper to remark, that the upper chamber above described, is so constructed as to be capable of answering the same purposes as a hot-house of a subordinate rank, which will abundantly pay for the expence laid out upon it, and will be in many respects preferable to those in common use at present. For, if vines, or other climbing plants, be trained up within the back glaſs from C to E, and under the roof from E to F or G, they will be forwarded, those near the top especially, nearly as early as those in the chamber below; only they will come in succeſsion. Nor will those vines tend to intercept the rays of the sun, so as to injure the plants in the lower house in the smallest degree.

Two inconveniences that will result from having the back roof E F, or E G of glaſs, it may now be proper to state, that those who judge them of importance may avoid them by making it of opaque materials. The first is, the danger of its being broken by hail. This danger, it is well known, is so small in Britain as to be little worthy regarding. The other is, that, should vines be trained up under that glaſs, the points of the twigs would be frost-bitten wherever they touched the

glaſs during frosty weather: this evil may be completely obviated by pinning sheets of oiled paper under the glaſs before the vines were trained in. This paper could be removed, if it were thought proper, after the season was so far advanced that no more frosts were to be apprehended.

Should any one wish for a green-house, it may be, with great propriety, connected with the hot-house; for, in that case, it might be employed as a reservoir chamber for containing heated air. For a green-house there ought to be no horizontal glaſs, but the house should be left clear to the roof; and that roof should be of glaſs of the usual form, but close puttied as the other glaſses; though just above the floor should be left some small openings for the admiſsion or emiſsion of air. As the house would be light on all sides, the stands for the plants should be raised highest in the middle; and those of the tallest sort, and tenderest as to heat, be placed on the highest shelves. For, although we shall show in what manner the house may be so ventilated as to render the temperature nearly equal in every part of the house if desired, yet it may prove a great convenience to have it of different temperatures in different places to a small degree, which may be easily done. It is scarcely neceſsary to add, that a *conservatory* could be here placed with the greatest propriety.

[*To be continued.*]

To the Editor of Recreations in Agriculture, &c.

THOUGHTS ON THE INCREASE OF BEGGARS.

SIR,

I AM induced to intrude again upon your attention with a few observations on a subject which has often occupied my thoughts, and which, if it is not of the very highest importance to the good of the state, is at least one of sufficient concern and general interest to render needleſs any apology, I might otherwise be inclined to make, for occupying the pages of your eſtimable publication. My wish is to call your attention, and that of your readers, to one of those nuiſances with which this great metropolis is infeſted, in the hope that you or they may be able to point out some practical method, conſiſtent with exiſting circumſtances, whereby the rapid course of this terrible evil may be ſtopped before it ſhall have increaſed beyond control. I allude to the very great number of beggars who ſwarm and raiſe their loud and piteous cries in every ſtreet and alley, to the great annoyance of all his majeſty's liege ſubjects, both charitable and uncharitable; and I cannot here but expreſs my ſurpriſe, that in this age of legiſlative furor, when endeavours are made to regulate and to bind every thing by ſtrict laws and poſitive regulations, that no effort ſhould have been made to reſtrain within due bounds this crying evil, which "has increaſed, is increaſing, and ought to be diminiſhed."

It is, I believe, generally allowed, that the number of these unfortunate objects is conſiderably larger in this part of our united kingdom, in proportion to its

extent and population, than in any other country of Europe, or even in the world; but I know not whether it has been attempted by any one to explain the causes of this superiority in wretchedneſs. It would lead into too wide a field for the compaſs of a letter, to go into all the circumstances which may have caused this material difference, and also occupy more time than I have now leisure to bestow on the investigation. In order to consider the subject fully and particularly, it would be neceſsary to compare the situation of the different countries in Europe with respect to their laws, the habits and manners of their inhabitants, and the degree of civilization and improvement which prevails in each.

As no other country in Europe poſseſses a constitution and form of government so particularly favourable to the arts of civilization as that which we have the good fortune to live under, and none have lately arrogated to themselves a superiority in those arts, the great increase of paupers cannot be considered as evidence of the unfavourable state of the country, but is, in fact, on the contrary, considering it in a commercial view, in my opinion, undeniable proof of its prosperity and its improvement. I ought, however, in this general statement, to have excepted the people of France, who, in all times, and under all governments, whether bending with submiſsive and abject suppleneſs to the orders and decrees of their hereditary monarchs, or imitating with proud and savage ferocity the manners of the renowned republicans of former periods, or servilely obeying the furious mandates of the Dictator Robespierre, the feeble Directory, or the more mild

laws which characterise their present government, have invariably taken to themselves, as if by a kind of divine admitted right, the first place amongst polished nations, and even erected themselves into a sort of college, from whence degrees of civilization were to be solicited and taken. However little inclined I might have been to dispute their claim to this high pre-eminence in other periods, I shall not now hesitate to pluck the garland from their brows, unless they can show some better title to it than by pointing to the horrors and massacres of their boasted revolution, which, for a time, destroyed all the powerful and engaging ties of kindred and of blood, the more durable affections of tender friendship, which set the father against the son, and the son against the father, in deadly irreconcileable enmity; and let loose a spirit of discord, revenge, and fury, which the lapse of almost ten summers has been unable to subdue. I trust you will pardon this digression which the subject so naturally led into.

There is no doubt but the wretched condition of many of the objects which present themselves continually to our notice, arises chiefly, if not altogether, from their own depravity and idleness; and, at the same time, there are many who appear in the extremity of distress from some motive almost inconceivable to a well regulated mind, who, in reality, possess sufficient property to hold a respectable place in society. Instances every day occur of this kind of fraud and ignoble peculation, to which, if there were not these actual proofs, no man would venture to assert the human species capable of submitting.

There is also another cause which I cannot forbear mentioning, both as it may tend in some measure to allay the great joy and exultation of those who speak with so much pride and rapture on the superiority of our manufactures compared with those of other countries, and as it may also operate as an additional argument in favour of the position established by you in some former Numbers of this work, of the greater stability and happineſs of a state pursuing agriculture than one relying solely on its commercial advantages; I mean, the great improvements which are every day made in the machinery, whereby our great manufactories are principally carried on, arising from the extended knowledge of mechanical powers. It is not uncommon for a single improvement of this nature to supersede the neceſsity of employing hundreds of people, who before that (to them) fatal invention, lived respectably on the profits of their own labour. The youthful part of them may indeed learn other employments, but those who are grown old in the practice of one particular occupation, whose faculties are become torpid, and minds void of elasticity, and consequently incapable of attaining further knowledge, are obliged to go with sorrow and regret for their lost independence to the general repository of the poor of the parish, or left miserable objects to gain their future subsistence by the aids of precarious charity.

It will not be supposed that I disapprove or condemn the exertions of mankind to facilitate the performance of laborious employments, or to cast a censure on those who devote their whole lives to the extending the effect of the wonderful power of mechanic

principles, for, considering it in the abstract, and as it relates to the general good, I do not hesitate to say, that no man can be more deserving of the thanks of his country, than he who, by his ingenuity, gains to the state the productive labour of any part of its inhabitants which might otherwise for many years be consumed and wasted. I only wish to point out the practical effects of the diminution of natural labour, that those who are so lavish in its praise, may take into consideration the evils which are thus brought upon a great part of their fellow-creatures, and thereby be enabled to strike the balance somewhat more justly than it is their custom to do.

I am sorry to be so unfortunate, unlike another of your correspondents, to mention this grievance without being able to propose any remedy, but the matter is of such importance that I do not feel myself competent to hazard any speculative opinion upon it. I am, sir, your most obedient servant, S. H.

The Editor perfectly agrees with the above Writer on the great importance to the nation of the object he has here brought under discuſsion, and cannot but regret that this correspondent, who seems to be so well able to investigate the subject with intelligence, should have declined to prosecute it; aſsuredly his time could not be better employed, in as far as regards the welfare of the community, than in elucidating this intricate question; and if imperious circumstances did not prevent it, he would certainly confer a great benefit on society to prosecute it; or, should this writer decline to engage farther, the editor will take it kind if some one of his intelligent correspondents will have the goodneſs to take it up; for he believes that every attentive observer is fully convinced that no one circumstance that can be named af-

fords a more discouraging prospect of futurity in this country as the very one here recommended to notice, unleſs some way can be devised for guarding against the evils that so obviously originate from this source.

To the Editor of Recreations in Agriculture, &c.

SIR,

I OBSERVE that you do not object to extracts from printed works if they be good. I met with the following in a very old newspaper, and the subject seemed to me so well treated, and applies so well to the present times, as well as to those that are past, that I could not help transcribing it; and, if you approve of it, I shall take it as a favour if you will give it a place in your useful work. I am, sir, respectfully, A CONSTANT READER.

HINTS ON DOMESTIC ECONOMY.

FROM AN OLD TRADESMAN TO YOUNG ONES.

Progress to bankruptcy of a diligent, sober, young tradesman, without loss, misfortune, or evil intention.

A YOUNG man of good character sets up in buſineſs with a moderate capital, and a good deal of credit, and soon after marries a young woman, with whom he gets a little ready money, and good expectations on the death of a father, mother, uncle, or aunt. In two or three years he finds that his buſineſs increases; but his own health, or his wife's, or his child's, makes it neceſsary for him to take lodgings in the country. Lodgings are found to be inconvenient; and for a very

small additional expence, he might have a snug little box of his own. A snug little box is taken, repaired, new modelled, and furnished. Here he always spends his Sundays; and commonly carries a friend or two with him, just to eat a bit of mutton, and to see how comfortably he is situated in the country. Visitors of this sort are not wanting. One is invited because he is a customer; another, because he may afsist him in his businefs; a third, because he is a relation of his own, or his wife's; a fourth, because he is an old acquaintance; and a fifth, because he is very entertaining; besides many who look in accidentally, and are prevailed on to dine, although they have an engagement somewhere else. He now keeps his horse, for the sake of exercise: but as this is a solitary kind of pleasure, which his wife cannot share, and as the expence of a whisky can be but trifling where a horse is already kept, a whisky is purchased, in which he takes out his wife and his child as often as his time will permit. After all, driving a whisky is but indifferent amusement to sober people; his wife too is timorous, and ever since she heard of Mrs. T—'s accident by the stumbling of her horse, will not set her foot in one; besides, the expence of a horse and whisky, with what is occasionally spent in coach hire, falls so little short of what his friend Mr. H—s asks for a job-coach, that it would be ridiculous not to accept of an offer that never might be made him again. The job-coach is agreed for; and the boy in a plain coat with a red cape to it, that used to clean knives, wait at table, and look after the house, becomes a smart footman with a handsome livery. The snug little box is

now too small for so large a family. There is a charming house with garden and two or three acres of land, rather farther from London, but delightfully situated, the unexpired lease of which might be had at a great bargain. The premises, to be sure, are somewhat more extensive than he should want; but the house is new, and for a moderate expence might be put in most excellent repair.

Hither he removes; hires a gardener, being fond of Botany, and supplies his own table with every thing in season for little more than double the money the same articles would cost if he went to market for them. Every thing about him now seems comfortable; but his friend H—s does not treat him so well as he expected. His horses are often ill matched, and the coachman sometimes even peremptorily refuses to drive a few miles extraordinary, for why, "he's answerable to master for the poor beasts." His expences, it is true, are as much as he can afford; but having coach-house and stables of his own, with two or three acres of good grass, he might certainly keep his own coach and horses for less money than he pays to Mr. H—s. A rich relation of his wife's too is dying, and has often promised to leave her something handsome. The job-coach is discharged; he keeps his own carriage; and his wife is now able to pay and receive many more visits than she could before. Yet he finds by experience, that an airing in a carriage is but a bad substitute for a ride on horseback; in the way of exercise he must have a saddle-horse; and subscribes to a neighbouring hunt for his own sake, and to the nearest assemblies for the sake of his wife.

During all this progreſs his buſineſs has not been neglected; but his capital, originally small, has never been augmented. His wife's rich relations die one after another, and remember her only by trifling legacies. His expences are evidently greater than his income; and in a few years, with the best intentions in the world, wanting no good qualities but foresight to avoid, or resolution to retrench, expences which his buſineſs cannot support, his country house and equipage, aſsisted by the many good friends who almost constantly dine with him, drive him fairly into the gazette. The country house is let,—the equipage is sold,—his friends shrug up their shoulders—inquire for how much he has failed,—wonder it was not for more,—say he was a good creature, and an honest creature,—but they always thought it would come to this,—pity him from their souls, and hope his creditors will be favourable to him,—and go to find dinners elsewhere. I am, &c.

To the Editor of Recreations in Agriculture, &c.

SIR, Aldwork near Rotherham, April 15, 1801.

In July last I was at a worthy friend's, the late Mr. Alexander Dudgeon's, at a beautiful country residence at Norwood, Middlesex. In the garden on the south front of the house, grow two handsome silver firs at 21 feet distant from it. I observed a phenomenon respecting one of them that I thought curious, and which I have not noticed in any author; it had made a shoot of 30 inches in length during the season, which was bent down near the top, and which

kept continually turning the same course as the sun, in the following irregular manner; the first time I observed it it made a complete revolution in 48 hours, the second in 5 days, and the third only half a circuit in 10 days, which I attributed to the great drought of the weather at that period. In turning round the bark, it appeared twisted into a sort of spiral writhe; and, as there were 48 spirals in the length, I doubt not its having made that number of revolutions during the spring, and to the time I last saw it; in July several persons observed and admired it, as well as myself, as one of nature's wonders, which was new to us, though it may not be so to you who have made so many more observations.

Wishing you succefs in your very useful endeavours to difseminate knowledge, and a series of good health long to continue it, I am your obedient servant,

JOSHUA WIGFULL.

For Doctor Anderson's Recreations.

LOOSE HINTS RESPECTING A PARTICULAR INSECT.

SIR,

THOUGH it often occurs to me that you must be frequently teased by accounts of things as new, that are well known to you; yet I cannot refrain from running a risk of becoming one of that clafs of correspondents on the present occasion; but, should this be the case, and should you think that the following facts, that were new to me, will not prove interesting to your readers, I request you will without ceremony throw this letter into the fire, and let it be no more heard of.

A few days ago, as I was walking in my garden,

and looking narrowly at the leaves of every shrub and tree in quest of insects, which prove destructive under such an infinite diversity of forms and appearances, I perceived a woolly-like appearance upon the tenderest leaves on the point of a shoot of a young plum-tree, and, upon a near inspection, I found that this was produced by an immense multitude of small blackish coloured caterpillars, which were crowded together upon these leaves amazingly close. These I immediately took off, together with the leaves; and, though I examined all the other leaves of the same shoot, I could not find one upon any of them. I discovered marks, however, of their progress from below upwards; and, by pursuing these marks downwards, I discovered the nest, from which the whole of this swarm had issued, which appeared to me, and another person who was with me at the time, so very curious, that I have been induced to send you an account of it.

This nest consisted of a series of rings that surrounded the shoot (a shoot of one year's growth) and closely confined it, exactly resembling several rings close together placed upon the twig. Each of these rings had something of a metallic appearance, and was thick studded with blackish marks, arranged quite round it in the most regular order, which appeared, upon a nearer examination, to be holes opening in small cells, in which the caterpillars had no doubt been hatched. These cells were now entirely empty. When I attempted to take off that ring, I found it consisted of a hard unyielding substance, that could not be displaced without a violent effort. This I effected by means of a strong knife, in doing which the ring was

broken. It then appeared, that instead of being a series of separate rings, as they appeared at first, it now appeared to be one broad ring (about a quarter of an inch in breadth) closely united in every part, and containing a number of rows of holes, running round the whole in the most beautiful order, that in no other respects resembled the cells of bees, unless in their regularity. The insect who had formed these cells had been by no means so economical of materials as the bee is of its wax; for it was greatly thicker in the sides, and stronger and more weighty for its dimensions than a honeycomb. The matter was quite hard and brittle, as glass, but opaque. In its fracture it exhibited a metallic splendour.

It had embraced the stem so closely as to have discoloured it, and bound it so tight as to prevent it from augmenting in size, as the other parts of the twig did; so that it was there smaller than any where else; and, as it did not appear to me that the cement of which these cells were composed could be dissolved in water, or softened thereby, I have no doubt that if it had been permitted there to remain, it would have entirely prevented the farther growth of the shoot in that place, in the same manner as a piece of twine would have done, so as to have thus made it in time break over at that place. It is probable that rings of this sort may be very frequently formed by the insect who made these; yet, if it were very frequent, I should imagine the phenomenon I have described must be often observed; but, as I never saw the branch of a tree cut through in that manner, this excites a suspicion that it may be rather a rare insect. If you, sir, or any of

your correspondents, will take the trouble to explain any farther particulars respecting this insect, it will much oblige IGNORAMUS.

Horticultural observations on a peculiarity affecting the Barberry Tree.

SIR, April 24, 1801.

THE following information in horticulture may probably be pleasing as well as useful to some of your readers. I was solicitous to procure a barberry tree of the species generally known by the name of maiden, being without seeds or stones in the fruit, and having a relation at a considerable distance, requested he would send me some offsets; accordingly I received a dozen, some I kept, and some I gave to my neighbours, all of us rich in the idea of our acquisition; when, lo! after waiting three or four years for fruit, behold our barberry trees produced fruit with seeds or stones in them. Vexed at the disappointment, I upbraided my relation with deceiving me; he as peremptorily assured me that every plant sent me was from his tree, every branch of which produced fruit without seeds or stones. Mentioning this to an acquaintance, he told me that some years since, he applied to a nurseryman in the environs of London for the same species of barberry that I had been in quest of, and his trees turned out exactly as mine had done. I asked every one that I thought was able to give me information on the subject, but in vain. At length, complaining to a friend of my disappointment, where I least expected information, I met with it. He told me

that some time since, as he was reading some of the early transactions of the Royal Society, he met with an eſsay upon the subject to the following purpose: that the maiden barberry is not a species perfect in itself, but an imperfect plant of the barberry, with seeds or stones in its fruit; and that this imperfection lies in the pith of the wood. If we reason on this subject from analogy, we shall observe a great appearance of truth. Botanists observe that the calyx is only a continuation of the outer bark, the corolla a continuation of the inner bark; consequently the pericarpium, the centre of the whole, will be continued from the pith, and further extended in the pistillum; the pith then being imperfect, will naturally render the fructification imperfect also. Variegated plants, such as geraniums, may also be said to be imperfect; but in these the imperfection lies in the leaf, and not in the fructification; consequently the seed of such plants will produce perfect plants without any variegation in colour; and it seems very probable, although the pith of the body and branches of the maiden barberry are imperfect, yet the root may be sound, so as to produce a perfect plant by offsets. The use, therefore, that may be drawn from this investigation is, that to propagate the maiden barberry we must do it from cuttings or layers, and not from offsets; and also the variegated geranium from cuttings, and not from seeds; and this maxim may be received generally where the leaf is variegated, but not universally, because I have seen the variegated maple raised from seed.

I thank your correspondent *H. G. H.* in page 29 of your second series, for inducing me to turn to page

136 in your second volume, and thereby giving me an opportunity of correcting a mistake; the word *tinea* should have been *tortrix*; and further, I have nothing more to say to that gentleman, your readers will judge whether the motto of *ne sutor ultra crepidam* belongs to him or me; but with you, Mr. Editor, I shall not part so indifferently; I know you have too much understanding to be imposed on; yet you also have candour enough to admit a truth upon circumstantial evidence.

Notwithstanding *tortrices* and *tineæ* are too often confounded together even by men who have some knowledge of the subject, yet in their habits as well as figure they differ much; yea, even the *tineæ* alone differ in their habits exceedingly, so that to point out the varieties would be as endless as it would be difficult; but, to speak to the subject in hand, it is a *tortrix* only that destroys the blossom of the rose; it is a *tortrix* also that destroys the blossom of the apple, but a different species. My dwarf apple-trees have now many of them. Wherever I meet with a leaf sticking to the blossoms, I open it, and find a caterpillar a quarter of an inch long, and of the thickness of the smallest pin; this insect is sufficient to destroy the whole cluster of blossoms; but what I would remark is, that I find no more than one insect in a whole cluster, as I find seldom, if ever, more than one in a rose bud. I observed, if you cut a rose-tree below any leaf of the preceding year, the tree would force a bud in spring where there was no appearance of a bud in autumn, and the branch from that bud would be perfect, because the insect lays its eggs in autumn, and would

not lay an egg where there was no appearance of food for its future offspring, nor lay more than there was a sufficiency of food to preserve it. Whatever we may call that quality in insects, whether instinct, sagacity, or by any other term, wonderful it is that the insect last year shall lay its eggs only in the place where its future progeny shall find its proper food and subsistence; and still further remarkable, that at the same time they provide suitable food for their offspring, they also provide a sufficiency; for, were they to lay more than one egg in a place, their object would be defeated, because their offspring would perish through famine. The caterpillars of the *tortrix* do not ramble like many others; for, having no covering of their own, they roll themselves close in the cluster wherein they feed: it is otherwise with some of the *tineæ*, they attach themselves to the bark or leaf, and move about like the snail, with its house on its back; these receive their nourishment from the leaf or bark only, and not the blosom. I saw a small white butterfly one day settle upon a leaf of mignionette and lay an egg, then to another leaf and lay an egg there, and so on to three or four, and then moved off to another plant. Whence this movement from place to place to deposit its eggs, but that each might be provided with a proper supply? It was from you, sir, I received information where the larvæ of the *tenthredo grossulariata* layed its eggs. It was on the very spot where it was to meet with its first subsistence. But there they were deposited in numbers, and for this reason there was a present supply, and to a future they were capable of migrating: hence I must insist, if you cut your roses

below any bud of the preceding year, your blosoms will be perfect, because the insect will not lay its eggs where there is no appearance of being supplied with food; add to this, you may see a proof of the point in question in every place where the gardeners cut their rose-bushes off near to the ground, and where those that are only pruned and kept high will be much destroyed. I did not think to have said so much; but you know, Mr. Editor, hobby-horses are strange ungovernable things, and mine will winch and curvet with a trifle; but a lash from such a man as you, sir, will make him run away with his master at any time.

One word more; your printer or compositor in the last page of your XXIVth Number, have very liberally given me credit for more nonsense than my modesty can dispense with. The first word of the third line there is clafs, it should have been *atlas*; my intention was to point out the particular species. If you preserve the original, by reference you will observe it. In its present reading it is not intelligible.

VERAX.

Nothing can prove more satisfactory to the Editor, than accurate investigations of any point respecting natural-history, and he is much obliged to this truly respectable correspondent for the foregoing remarks. The matter, however, is not yet made so clear as to preclude all room for doubt. Respecting the barberry, it is at least a *possible* case, that the original plants may have been propagated by budding or grafting, and in that case it would be nothing surprising if the suckers should be different from the fruit-bearing part of the

plant. Till this point, then, be perfectly ascertained, all reasoning upon the subject must be deemed premature.

The Editor is indeed so much afraid to trust to any kind of reasoning *à priori*, that he dreads being misled wherever it is attempted. He confeſses that the facts which ascertain the truth of the received theory respecting the formation of the different parts of fructification above alluded to, are not as yet so clearly ascertained as to free all manner of doubt from his mind respecting this. The use of the pith in trees is in particular involved in great intricacy, and he thinks facts may be found that ill accord with any theory he has seen respecting it. It is well known that Mr. Forsyth has produced many complete trees from a small bit of bark only upon one side of the stem being left alive, not only after the pith had been wholly destroyed for many years, but even the wood itself almost entirely consumed; yet these trees produce flowers and fruit in as great abundance and perfection as any others. Is it certain that a new pith is produced in these cases? It is believed not; and if so, what becomes of the theory?

The observations respecting the *tortrix* of the rose-tree, are apparently well founded. But does not this ingenious correspondent draw a conclusion beyond the limits that the fact he states, granting it to be proved, will fairly authorise. If a rose-tree never carried more than one flower, and that flower invariably upon the top of the stalk, the insect must of course be wholly removed if that bud were cut off. But if there are many buds on a rose-tree at different heights, that would become flowers, though it were not at all

pruned, may it not happen that the insect may deposit its eggs on some of those as well as the higher ones; and, although the stems were actually pruned down, yet some of these infected buds might be left, and thus the disease be there experienced? It is believed that it is a fact that rose-trees that have been pruned pretty short down, have their flower buds sometimes destroyed by that insect; and from this fact many persons may infer that the theory of *Verax* as to this particular, is not well founded. Yet it may in truth be so; and, though the disease may be *diminished* by this process, it would perhaps be going too far to think it would be *entirely removed* by that means.

The Editor much regrets that occasional errors of this sort are unavoidable, though he trusts such arrangements are adopted as to render them less frequent in future than they have been.

Reading Memorandums.

"In the old English days, when the drawing-rooms of palaces were carpeted with clean straw, and maids of honour breakfasted on roast beef, the pulpits shook with virulent invectives against pride of furniture and delicacy of food."

"To a mind well harmonized, all nature wears a pleasing aspect; and the transition is easy, from a relish for external beauty, and the pleasures arising from poetry, eloquence, and the imitative arts, to a love for moral perfection and the dignity of character."

"Mirth may properly be called an Aurora borealis; whereas *good humour*, like a fixed star, sheds a con-

stant stream of light, which, if it does not dazzle, has at least at all times a chearing influence."

"She had every grace of person, and every elegant embellishment of the mind; in her eye, to use the expreſsion of a fine poet, "*Love ever wakes, and keeps a vestal fire.*"

"Sounding periods and pompous expreſsions no more constitute a beautiful style, than strutting in red-heeled shoes and gold-clocked stockings can make a graceful walk."

"Religion, which should make us live in peace and charity, is the source of our most violent animosities; no one being willing to let his neighbour worship the supreme Being according to his own ideas, and his own feelings, though each person is resolved to usurp that liberty himself."

"Every topic is treated by Dr. Johnson with great erudition and strong sense, enlivened with all the glowing colourings of a fervid imagination, and the whole carried on with a nervous, clear, harmonious style."

"The regions of reflection are like a champaign country, in which different objects present themselves in various attitudes to the eye, and the imagination is frequently caught by parts of the prospect which have escaped another's observation."

"There is a right species of pride to which every man is entitled, and that is, a spirit above dependance, above flattery, above an abject deportment, and above every thing poor, sordid, and little. There is a pride which may serve to invigorate honour, to embolden truth, and to carry virtue to an higher pitch of improvement than it might attain unaſsisted by this secondary motive."

"Death is one of the conditions of human life, and we all hold our existence in this world upon the same precarious tenure."

"Some other scheme must now engage my brain,
For he who once has eat—must eat again."

"The sixth book of Virgil's Æneid has always been a favourite with me, for the noble sentiments of morality, and the inimitable strain of poetry which runs through it."

"The pleasing anxieties of virtuous friendship; the grateful solicitude of love."

"I have known so many unexpected turns and revolutions of things, that were I to see the Monument walk down Cheapside, and take out St. Paul's church to dance a minuet, it would make no manner of impreſsion on my spirits, more than when I read that it will be high water at London Bridge at half past ten!"

"He is one of those *things*, that "would be poets thought."

The Editor has received letters from several gentlemen, offering farms to let, by which it would seem that they considered the letter he inserted in his last Number concerning farms as an advance in him to become a sort of go-between, or broker, in that article, than which nothing could be farther from his intention. He wishes to have no concern in transactions of that nature, for they seldom can be productive of pleasure to either parties. He hopes his correspondents will have the goodneſs to accept this general answer, for to give particular answers would be a task too arduous for him to undertake.

To *Ruscina* the same answer will nearly apply. He will only add, that if a dairy is to be intrusted to the management of a dairy-maid by one who knows not about it, he knows no way of succeeding but by allowing that dairy-maid to follow her own method; for most aſsuredly every experiment that is intended to have a different tendency will, under her hands, infallibly fail.

27.

MAY 1801.

RECREATIONS, &c.

N° 3. Second Series, Vol. I.

Observations on the most proper measures to be pursued for obtaining the best kinds of potatoes, for extending the uses of that valuable esculent, and for improving its culture.

[*Continued from page* 102.]

QUERE III. "*What is the average produce per acre?*"

I SHOULD not have ventured to state the produce of potatoes that may be obtained from an acre, unleſs I had previously explained the circumstances above mentioned; because I am sensible that the facts I shall now state, would be, by many worthy cultivators, deemed impoſsible. I have no hesitation, however, in saying, that I have actually reaped of good marketable potatoes at the rate of more than thirty tons weight* from a Scotch acre of ground (the Scotch is to the English acre as 5 to 4 nearly): and I am very far from thinking that this is the utmost maximum produce that can be obtained. I here

* I have indeed, in some experiments, had at the rate of more than forty tons.

state the weights of produce in tons, because every one who chooses it can easily reduce it to the measures best known to himself. It is equal to 1120 bushels, at 60lb. to the bushel. I conceive that most persons will find that this is considerably above the average produce obtained, though some individuals will come much nearer it than others. In the present state of our knowledge respecting the *kinds* of potatoes and other circumstances, I should conceive that *thirty* tons from an English acre might be considered as about a maximum crop. But should the attention of men be directed steadily to the raising new varieties, and always selecting the best, from what I have already seen on this branch of the subject, I should not be surprised if, in the course of some years, the above named produce, however high it may at present seem to be, would come to be considered as nearer a *minimum* than a *maximum* produce.

With regard to the price of potatoes, as that must vary in every district according to circumstances, it is best for every one to inquire what it is in the place where his interest lies;* the quantity being known, the price there can always be easily ascertained.

I can say nothing from experience as to the effects of rearing potatoes for many years succeſsively upon the same ground, having never tried so to rear them myself; but I have seen no fact that seems to indicate that the ground is ever deteriorated by this crop. But the whole doctrine of the exhaustion of ground by particular crops,

* About Edinburgh the price on an average used to be about forty shillings per ton, or 1s. 1d. per bushel. The price has had an enormous rise of late.

would require such explanations before it could be rendered properly intelligible, as it would be very improper to enter upon in this place. Perhaps the best places to learn whether ground, when repeatedly cropped with potatoes, becomes gradually less fitted to produce that crop than before, may be the neighbourhood of Manchester and Liverpool; or in the West Highlands of Scotland, among the rocks, where the little ground they can cultivate is chiefly employed for rearing this plant.*

With regard to the use of the stems of potatoes for feeding beasts, and the effect of cutting them, in as far as respects the plant, little need be said. If the tops be cut while they are yet in a green and succulent state, they are readily eaten both by cattle and horses, and prove a very wholesome food to them: but these can never be cut over with safety, till the very moment the potatoes are to be taken out of the ground; for my experiments prove, in the most decisive manner, that the farther growth of the potatoe (the bulb)

* I cannot help here expressing my disapprobation of that decisiveness with which I observe many men speak of the potatoe, and other crops, as being of an exhausting nature, or the reverse. Were these gentlemen to be desired to state the experiments on which they ground these opinions, they would soon find that they are of a nature that are far from authorising such decisiveness. It is probable, were they to extend their inquiries, and take a comprehensive view of facts that are within their reach, they might meet with as many that would tend to support the opinion that is opposite to their own as that which they have adopted. Accordingly we find that nothing is more common than to meet with two persons who are equally decisive in opposite opinions. Is there any crop that is universally exhausting? Is there any crop that is invariably of an ameliorating nature? If there be not, what are the circumstances that constitute an exhausting or an ameliorating crop?

is entirely stopped the moment that the stem is cut over: and, as the bulbs are in a state of rapid advance when the stalks continue still in full verdure, no practice could prove more uneconomical than that of cutting off the stems at this period of their growth, and allowing the bulbs to remain still in the ground.

With regard to the *quantity* of forage that may be thus obtained, it will vary amazingly, according to the *kind* of potatoe cultivated; for the diversity in this respect is very great. Some kinds carry an upright firm tree-like stem, that never bends downward, and affords very few leaves, and these dry and sticky; while others send forth an immense multiplicity of soft trailing stalks, furnishing large lateral ramifications, garnished with a vast profusion of very succulent leaves. Some rise to a prodigious height, having large hollow stems and waving branches, while others are extremely weak and puny, scarcely ever rising beyond one foot in height, and tending very quickly to decay. Nor are these peculiarities any indication of the state of the bulbs, which are sometimes very large and abundant at a puny stem, and *vice versa*; so that the benefit that can be derived from the tops of potatoes will be extremely different in different circumstances, and must always be confined to those alone that are taken up for early sale. Where the stalks are large and abundant, they ought always to be collected together when dry, after the crop is taken up, as these will afford a great abundance of excellent litter; which, being very strong, would make a very good surface-dreſsing for a fresh crop of potatoes. But an attention to the economical management of forage for the purpose of aug-

menting dung, seems to be so little the taste of the present day, that this, and many other articles of the same kind, will, I fear, be disregarded.

I may just take notice, before leaving this branch of the subject, that my experiments have clearly proved the inutility of covering the stems of the best kinds of potatoes cultivated among us. An opinion is very generally entertained, that when the stems are laid down in the earth, they send out bulbs from these stems in great abundance. I can say from experiments very carefully conducted, that I have not found this to be the case in the smallest degree among those kinds that I have usually cultivated; but that laying down the stems, and covering them with earth, *diminished* the produce. I would not, however, pretend to afsert that this will be found to be *universally* the case; for I have remarked, that in wet seasons *some kinds* of potatoes have a tendency to send out small bulbs from the stem, which continue there of a blackish green colour. These, if laid under the earth, would no doubt become of the same colour with the bulbs; but I doubt much if they would ever come to a great size: but not having tried these, I cannot speak with certainty. [I have since tried them, and find that the potatoes thus produced answer as well to plant as others of *the same size* of the same sort of potatoe.]

From the foregoing statement of facts, which are the result of a pretty extensive experience in the cultivation of this plant for many years past, aided by not a few experiments conducted with a painful degree of accuracy, it will, I hope, appear evident, that one of the circumstances which has tended the most to re-

tard the general culture of this plant, is the difficulty of obtaining, with *certainty*, the best varieties. In the various excursions I have made through the country, I have found the effects of this want severely experienced. In some places, they cultivate sorts that never can be made to produce one half of an average crop: in other places, the kinds they have are of such a bad quality, as nothing but a want of other food could induce one to eat them. The badneſs of the quality makes the demand much leſs considerable than it otherwise would be: and no fact is more certain, than that the *quantity* grown by the farmer will always be in proportion to the demand. The average selling price of potatoes throughout the whole kingdom, which is liable to leſs variation than any other kind of human food, is an abundant proof that the *quantity* reared has generally kept pace with the *demand*. The want of market then is the only circumstance that sets bounds to the culture of this esculent: and if its culture is meant to be extended, measures must be adopted to extend the *demand*; without doing which, the whole national treasure may be expended in vain to force an extra production of them. It may breed up a swarm of wretches, who compaſs heaven and earth, *per fas aut nefas*, to gain a premium, but never will promote the exertions of honest industry.

That an abundant market for potatoes always produces an extensive cultivation of that plant, is obvious from an attention to the circumstances in which such extensive plantations are found. In the neighbourhood of every large town you find extensive fields of potatoes universally; but in distant parts of the coun-

try, no such thing is any where to be seen, except in some parts of Lancashire and Cheshire, near to the canals, from whence (besides supplying Manchester and Liverpool) they are shipped off in large quantities for Ireland, and on the eastern coasts of Yorkshire, and a few other places, for the London market, where they must of neceſsity be sold at a very advanced price to pay for the carriage of such a weighty article, and warehouse rent for such a bulky and perishable commodity. In country places, every family raises a few to serve itself. A farmer does the same for his own family: but were he to try to sell them in quantities to make up his rent, Where are purchasers to be found? In his own neighbourhood there are none. The towns at a distance are all abundantly supplied; and the expence of the carriage to that market would in many cases amount to half the price. The risks attending the cultivation of this crop, the vast quantity of barn-room that is required to preserve them from frost in winter, and the still greater extent of it that is required to prevent them from *growing* after the spring comes in, renders the keeping them *in great quantities* a very expensive, and even an impracticable thing. Nothing can more clearly prove the universal disposition to cultivate this plant, than the wonderful exertions that have been made in all distant parts of the country to overcome this difficulty. The practice of *hutting* them in the fields has been there adopted almost universally,—a practice that scarcely any thing else than *necessity* can be pleaded in its favour. Where a *few* are to be preserved for the use of a private family, it may be borne with, because in that case one

is not under the neceſsity of counting the cost, and the expence escapes observation; but where they are to be considered as a marketable article,—where a merchant who buys and sells must enter every article of expence incurred in his books, it is soon found that the *expence* and *risk* of this practice can in no case be borne, and it must be abandoned; unleſs in such a place as London, where all these items of expence neceſsarily concur in augmenting the price to a rate much beyond what any one who had not adverted to things of this kind would believe could ever be neceſsary.

The difference between the barn-room required for ground cropped with potatoes or with corn, is inconceivably great. A barn that would not be capable of containing more than the produce of one acre of potatoes (a maximum crop) would be large enough to thresh and dreſs the produce of five acres of corn at least every day: this is thirty acres per week. And as the barn with the potatoes will, on an average, be occupied by them at least nine months in the year, it appears that *one* acre of potatoes will require as much barn-room as *might* serve to dreſs all the corn produced on upwards of 1100 acres of ground cropped with corn! So long as the miserable system so generally prevails of gentlemen refusing to grant leases, and the wretched expedient of throwing repairs upon the landlord (which is a neceſsary consequence of it) exists, What hope is there that ever this insuperable bar to the very extensive culture of potatoes upon a large scale can be removed? The very difficulty of keeping them deteriorates their quality, and thus diminishes the demand. After the spring commences,

potatoes cannot be prevented from sprouting, unleſs they be spread out thinly on a floor, and often turned. Nay, even in winter, when they are put together in great quantities, unleſs they have been previously dried with great care, they will send out long shoots; and at that time they must not be opened for fear of frosts. The stems that have thus sprung out are carefully rubbed off, and the potatoes from which they have been separated are blended with others in the market: unskilful persons purchase them; and, finding the potatoes very bad, consume the fewer of them. The difficulty of keeping potatoes, and the neceſsity of their being dreſsed by fire before they can become a very nourishing food for beasts, will always operate to prevent them from being extensively used in that way; and the revenue laws prevent them from being employed in the distillery, the only way in which they could be made extensively useful as a food for beasts. In short, there is no extensive market; and in the present state of things, there can be none found for this article, unleſs it be in the neighbourhood of some large towns, or particularly circumstanced sea-ports, where only they can be extensively reared.

These circumstances may very naturally escape the notice of the gentlemen who compose the Board of Agriculture, and others; but they never can cease to be deeply felt by the farmer who should incautiously enter fully into that line; and his future conduct must be influenced by it.

From the produce that I have shown may be obtained from an acre of land in potatoes, under good management, there is no doubt but many farmers, in

distant parts of the country, would gladly enter into the spirited culture of that plant, could they find a market for it; but in these situations *one* great object of the farmer's attention must be to find a crop that can be carried to market *at a small expence*. Potatoes are a crop directly the reverse of this to an astonishing degree: nor is the expence of cultivating it so easy, or the accidents to which it is liable so few, as not to oblige a man to act with some degree of caution, especially where tithe is to be exacted; which in this, as in all other cases, must operate as a powerful bar to spirited cultivation of any sort. To obtain a *maximum* crop of potatoes, I do not overrate the expences that must be incurred, including seed, culture, manures, and rent, at twenty pounds per acre. If the crop be good the farmer may be indemnified, and perhaps a little more. The tithe would have been a good profit to help to indemnify him, in case of a succeeding one failing; but it goes into the pocket of another, who incurs no part of the expence. If the crop fails (which happened almost totally and universally in the year 1782 in Scotland) not only the profit is lost, but the whole outlaid money is gone for ever. Under circumstances of that kind, a spirited and extensive cultivation can never become general. Wealthy farmers, who alone can bear the charge of a spirited agriculture, will keep aloof from it, on account of the difficulty of sales;* and it must be abandoned to those of an in-

* No person who has not tried it can form an adequate idea of these difficulties. Even in the neighbourhood of this place (Edinburgh) where the consumption of this article is considerable, it will in general be the work of one horse and two persons *three* days to sell a ton of potatoes,

ferior stamp, who have neither the skill nor the enterprize to push the cultivation of this plant, in all its branches, to the perfection of which it is susceptible.

The circumstance that is most wanted (I have already said) to lay the basis of this good culture, and to render the use of this valuable esculent more universal among all ranks of people, is to devise a mean by which cultivators in every part of the country may be certain of being able to get the very best kinds known, both in respect to palatableneſs and productiveneſs. Nor do I know any way in which this could *possibly* be effected, unleſs it can be done under the auspices of the Board of Agriculture, or some other body of public spirited men. The object to be attained is obviously of very great national advantage; but whether it will appear to be of as great importance by the honourable members of that Board as it does to me, I am much inclined to doubt. If it did, I think it could be with certainty effected. It is my duty to suggest what appears to be best for the public weal: it is the province of the Board, and others, to judge whether these suggestions deserve to be attended to or not. To the public I beg leave to submit, with all due deference, the following observations:

The first great point wanted, is to obtain a kind of potatoe which, when compared with others of the best sorts, shall be deemed the most palatable; for I hold

by hawking them through the streets. If they are sold by little people who keep a stand, they must be kept by the farmer till they are wanted, and sent to town in small quantities of one third or half a ton at a time: and even in that way they must be sold at a vast discount, and no inconsiderable risk.

it to be an undeniable fact, that it is the unpalatableneſs of many of the kinds of potatoes now cultivated, that renders the consumption of them much smaller than it would have been.

The next particular to be adverted to is, that it should be also the most productive kind.

And the last circumstance I should at present inquire for would be, that it ought also to be the earliest.

To find all these qualities, in the highest degree, united in one and the same potatoe, will probably be a matter of great difficulty; but it is certainly not impoſsible: and where a number of people are induced to bend their attention with great steadineſs towards one point, it is inconceivable how accurate they will become in the discrimination of facts, that otherwise might have totally escaped their notice. And where an immense number of facts, all tending towards one point, are brought together, so as to admit of their being accurately compared with one another, more may be done in one year than could have been done otherwise in a hundred years.

Upon this principle I should humbly propose, that the Honourable Board of Agriculture, or Parliament, or some other body of men, should hold out a *very high* premium* to the person who should produce to the Board before such a day one thousand sets of potatoes,† that had been all the produce of one ori-

* I consider this as a premium given to the eaters, to make them consume more; nor do I know any other kind of premium that will produce this effect.

† Fewer than this number I should reckon unfit for making the fair comparative trial afterwards recommended.

ginal plant, each set weighing two ounces at least; which should poſseſs, in the highest degree, the three qualities above named. That is to say, the potatoe which should be known, by experiment made for that purpose, to be capable of producing, on a good soil, with good culture, at the rate of *thirty* tons weight of good marketable potatoes per acre; and which, in a good season, shall attain to their full maturity on or before the first day of August.

Before the potatoes can be admitted to a competition, let attestations be brought, duly authenticating the fact, that the quantity required had actually been produced on an acre, or in that proportion, and that they had completely attained their full size before the first of August; and likewise that the whole number of plants had been propagated without admixture from one original stem: and that the potatoes had been tried, and found very pleasant to eat by a good number of persons. Under these preliminary precautions they ought to be admitted to a fair competition for the premium.

I have said before, that the premium ought to be *high*. How high the Board will choose to go, depends upon the Board, or Parliament, or others who shall choose to hold out that premium, alone to determine. My own opinion decidedly is, that if great effects are to be expected, it cannot be too high. When this is the case, the premiums are few, and cautions can easily be adopted to guard against frauds, where the distribution depends upon a number of men respectable for rank and fortune: nor is it poſsible to conceive the eagerneſs that the hopes of obtaining a very high premium will excite among an infinite number of indi-

viduals who are capable of making accurate distinctions, or the exertions it will produce: whereas a number of *small* premiums seldom produce any other kind of exertions than those that are calculated to deceive. It serves as a whetstone to cunning: and collusions and multiplied frauds are the only fruits that are produced by them in abundance. It is from these considerations that I have always compared numerous small premiums, whether they are given by government, or by individuals of high rank, as being exactly similar in regard to their operation upon wealth, to that of rust upon metals, which imperceptibly consume it, while they at the same time serve to contaminate the place where that operation has been carried forward. I have not a doubt, if a thousand pounds were distributed in a thousand premiums of twenty shillings each, or the same thousand pounds to be offered in *one* premium only, but that the sum total of the exertions that would be made throughout the nation at large to obtain the high premium, would be at least a thousand times greater than those that would be made to obtain the smaller sums, though ten thousand times the number of frauds would be practised to gain these small premiums.

One great use of the mode of distributing premiums I propose would be, that it would give a fair opportunity of ascertaining, by actual experiment, the real comparative value of the different *good* kinds of potatoes, and of distributing *the best* sorts throughout the whole kingdom; so that every person who became poſseſsed of it, would be certain that he thus obtained a known standard, by which he himself would have it

in his power to ascertain the comparative excellence of any other variety that might fall in his way.

That nothing may be wanting on my part to forward this very useful undertaking, I shall beg leave to subjoin full directions for the manner in which the potatoes ought to be cultivated, so as fairly to ascertain the comparative value of the different kinds admitted to the competition, and to distribute the best kinds, after they had been thus ascertained, so as to answer the purposes intended.

[*To be concluded in our next.*]

On the patent hot-houses, in as far as respects the management of the heat afforded by the sun alone.

[*Continued from page* 139.]

BESIDES the influence of the circumambient air during the absence of the sun, there are other circumstances that tend powerfully to diminish the heat of hot-houses, the not adverting to which has greatly augmented the consumption of fuel to keep up that heat, and not only unneceſsarily added to the expence, but to the difficulty also of managing all kinds of conservatories of plants.

Dr. Hales, in his unparalleled work called "Vegetable Statics," took notice of the great *consumption* of air, as he called it, that was made by animals in the proceſs of breathing, and by burning bodies; nor were the effects of growing vegetables on that subtile element entirely unnoticed by him; but it was reserved for succeeding naturalists to account for those phenomena which he remarked. It was rendered obvious

by his experiments, that the bulk of any given quantity of air was greatly diminished by animals respiring it, and by inflammable bodies burning in it; and that, in proportion as its size was thus contracted, it became less fit for sustaining life or exciting flame, till at length it totally lost the power of doing either. This he considered as a destruction of the air. Succeeding experiments have proved, that this is merely a modification of the atmospheric air; or, to speak with greater precision, they have discovered, that in every portion of atmospheric air there is a mixture of two kinds at least of air (I take no notice of others on this occasion, as they are foreign to our purpose); one of which is capable of sustaining life and exciting flame, which has been called *vital* air, and the other is totally unfit for these purposes, and has been denominated *mephitic* air: that the proportions of these two constituent parts of atmospheric air may be varied by certain processes, so as to diminish the one and augment the other; and that animals and vegetables are powerful agents in these processes. All animals that breathe have a continual tendency to diminish the proportion of *vital*, and to augment that of *mephitic* air; so that every particle of air that is *ex*pired by man or other animals during the process of breathing, contains a greater proportion of mephitic air than that which he *in*spired; and, as mephitic air is of much greater specific gravity than vital air, the general mass is of course necessarily diminished in bulk by that process. That the air is not, however, *consumed* or *destroyed* by this process, is obvious from this circumstance, that by another process, the reverse of the former, this air, which

had an over-proportion of *mephitic* in it, may have its former proportion of vital air restored to it; and, when this happens, its bulk is proportionally augmented; or, in the language of Dr. Hales, the body which produces this effect *gives out air.*

That accurate experimenter observed, that, during the process of vegetation, plants, on many occasions, gave out air, while in others they absorbed it; and it has by late experiments been pretty fully ascertained, that mephitic air, which is so hurtful to animals, is extremely beneficial to vegetables; insomuch that the generally received opinion among philosophers now is, that mephitic air, or, as it is called in the new system of chemical nomenclature, carbonic acid gas, or carbon, if it be not actually the pabulum of plants, is at least extremely beneficial to the health of vegetables, which readily imbibe it in great quantities; but, as in the animal process vital air is diminished and mephitic air augmented, the reverse of this for the most part takes place in the vegetable process; the proportion of mephitic air being thus diminished, and that of vital air augmented. It is in consequence of this, that the bulk of the air is sometimes augmented by the vegetable process, instead of being diminished, as in the animal process.

It deserves, however, to be particularly remarked, that this rule is not universal. The conversion of mephitic into vital air only takes place by vegetation when that goes forward *by day.* During the *night*, while the influence of the sun is withdrawn, the proportion of mephitic air is augmented by the vegetable, in the same manner as the animal process; and, of course,

the general bulk of the air is in like manner diminished by it. The attentive reader will easily perceive what influence this must have on the hot-house. Not only does the air contract during the night-time in consequence of the cold from without affecting it, but the quantum of its contraction is still farther augmented by the production of mephitic air during that period; and, as the neceſsary effect of that increased contraction is a more copious in-draught of air into the house when it is constructed in the manner that hath hitherto been practised, the intensity of the cold produced by this means must be thus greatly augmented. But upon the new plan nothing of this sort can ever be experienced; for, instead of drawing in a copious shower of *cold* air during the whole night from above, which is diffused over every part of the house with a most destructive regularity, it only inhales a portion of *warm* air, which does not permit the smallest abatement in the heat of the superior regions of the house, especially during that period.

Another unobserved cause of great cold in the house, and consequent waste of fuel to diſsipate it, arises from the temporary use of steam in hot-houses, which has been of late introduced, and which, under judicious management, must be productive of consequences highly beneficial; but these beneficial effects, in consequence of the circumstance to which I here allude, and some other particulars, have been hitherto recognised by a few only, and by those few in a very imperfect degree.

Steam, it is well known, is water converted into an elastic vapour. The water itself, by this proceſs, suf-

fers no other change than that which results from a new modification of form; no more, in short, than it does when it is converted into ice. In the state of ice it is a solid body; in that of water an unelastic weighty fluid; in steam it is a light elastic vapour, easily reducible again to water or ice, merely by a variation in its degree of heat. The most important phenomenon that occurs in the proceſs of converting water into steam is, the amazing expansion of this substance under this change of modification. Steam from boiling water, under its lowest degree of heat, occupies about *eight hundred times* the space that it did as water; and, as it admits of being almost instantaneously refrigerated, and thus brought into the state of water, it has come to be employed as one of the most forcible and commodious moving powers yet known, under the particular modifications that it is made to undergo in the steam engine. It is rather surprising, that the obvious effects of such a well-known agent should not have been adverted to in the hot-house: yet so it is; and the occasional use of steam, which is in many respects so beneficial, has tended very much to produce a great and unneceſsary waste of fuel there.

Steam is much lighter than atmospheric air; as well as much hotter, when in its unmixed state, than any air ever is in our regions. Hence, it is no sooner introduced into the hot-house than it produces a strong expansive burst, forcing out a great deal of the air through every opening in the house; so that, were the steam introduced in sufficient quantities, while the windows at top were perfectly closed, and some openings below left unclosed, there can be no doubt that

in a very short time the house would be almost entirely filled with it; so that scarcely any common air would remain mixed with it. And were an incautious gardener, while things were thus circumstanced, to squirt a shower of water from his forcing engine into the house, it would occasion such a sudden vacuum, in consequence of the condensation of the steam, as would infallibly drive in all the windows of the house. Luckily, no person has been so foolish as to try this mode of procedure. In general the steam is introduced in small quantities, pretty low in the house; where, intermixing with the air in its ascent, it neceſsarily becomes visible in consequence of its partial condensation; and, being thus in part cooled, it diffuses itself gradually throughout the whole house. If this proceſs be long enough continued, and steam be admitted in considerable quantities, the heat will be raised very high by it, and the air, of course, proportionally expelled from the house. When this proceſs is at length neceſsarily discontinued, the condensation of the water where it comes into contact with the walls, or glaſs, or plants, is greatly accelerated; of course, the vacuum is felt to a proportional degree, and cold air is drawn into the house through every cranny with such irresistible power, as to force it inward in innumerable and abundant streams. The heat in the house must, of course, instantly subside, in spite of every effort to keep it up. The fire, under these circumstances, though excited to the highest degree, cannot prevent this sudden burst of cold; but in a short time it will produce a burst of heat greatly too high for the health of the plants. To moderate which, openings must be

made, through which partial streams of air hurtfully cold will soon find entrance. Thus are the plants alternately exposed to the extremes of heat and cold, while the fuel is blazing with fury to be dissipated "in the desart air." I appeal to every careful manager of a hot-house to say, whether these effects have not been experienced by him whenever steam has been applied in the house itself without the most careful precaution? (Of its use when confined below the tan-bed, I do not enter into the consideration at present.) Is it a wonder, that under these circumstances so many experienced gardeners should deliberately resolve to deprive themselves of the benefits which they might dērive from the use of steam in the manner above described? Though in fact there is no possibility of excluding steam entirely from the stove; nor could the plants be there preserved in health if it could be wholly excluded; and it is owing to the ineffectual struggle to obtain the two incompatibilities of steam without cold, and moisture without damp, that all the difficulties which have been hitherto experienced in the management of such houses have arisen. These difficulties, it is hoped, will now be completely overcome.

The cold that succeeds to the use of steam can now, it is plain, be entirely obviated by the construction of the house explained in our last. For, no sooner is the vacuum produced by the condensation of the steam, than, instead of *cold* air being drawn in from *without*, *hot* air is brought from the *auxiliary chamber*; so that no cold can be produced in the house by this kind of exhaustion; nor can there be a necessity for consuming any fuel to restore that heat which had been thus abated.

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Nor are the effects of the cold that arises from this source confined entirely to those houses where steam *from boiling* water is occasionally employed. Steam, as has been already said, must, to a certain degree, be produced in every house where the heat of the stove (about 90 degrees) is kept up, and vegetation goes forward; for the earth in which the plants are reared must be moist, and under the influence of that heat some degree of evaporation will neceſsarily take place. This sort of imperceptible evaporation is constantly going forward during the *day-time*; but, as the vapour rises slowly, it will, in general, then make its escape through the roof nearly as fast as it is produced, unleſs we except that portion of it that is condensed upon the walls of the house, the glaſs, and the plants themselves; which being colder in general than the air in the house, that moist vapour attaches itself to them, where it is slowly condensed, and produces a kind of moisture, which, upon the plants themselves, is often salutary, though it be accompanied with cold; but in dull and cloudy weather the moisture thus produced often becomes extremely pernicious, killing many tender plants, frequently the most valuable of the collection, under the well known name of *damp*. The same disease, and from the same cause, is sometimes experienced in the open air, though seldom, and to an inferior degree, during a long continuance of dull, calm, and cloudy weather, when plants are observed to languish, compared with that health which they exhibit in clear weather, accompanied with such gentle breezes as usually prevail during the season of vegetation in this climate. Our aim is, to give to plants

within the house the same degree of heat and luxuriance that they would enjoy in the open air in a region whose temperature was suited to the plants so reared.

Hitherto, the only kind of ventilation that it has been within our power to give to plants in the house has been produced by opening the higher glaſses of the house, and thus allowing the heated air to iſsue from it; to supply whose place the lower glaſses are at the same time opened to allow a current of cold air to enter and be heated, and thus carried off in its turn. This proceſs is objectionable in two important respects. *First*, it occasions an immense expenditure of heated air; for, even during the warmest weather ever experienced in this climate, it is scarcely poſsible, by means of any fire that can be raised, to produce so much heat as to occasion in this way a current of air that can in any degree be compared with the violence of even a gentle breeze, in the direct track between the lower and higher openings, far leſs in the withdrawing corners, and other sheltered parts of the house; and during cold weather no such ventilation dare be attempted, because the plants would be chilled to death by it. But, unleſs some degree of ventilation were attempted, they must all infallibly perish in a short time. To preserve them, then, even in a languid state of existence, an immense expence, on account of the great consumption of fuel, must neceſsarily be incurred, to produce that imperfect state of ventilation. And this is the circumstance which renders hot-houses of every sort so very chargeable to the owners, as well as troublesome to those who are entrusted with the care of

them; and, *secondly*, after that heavy expence has been incurred, the ventilation is so very imperfect, that all the plants languish; for, that moist warm air is so extremely favourable to the vegetation of mould, and an infinite variety of minute parasitical plants, and the generation of insects of various sorts, that no care in other respects can ever preserve the plants from being infected by these to such a degree as altogether to kill immense numbers in every unfavourable season. This disease is so universally known, and the cause of it so obvious, that it has obtained the name of *the damp* in every part of Britain; and nothing is more common than for the owner of rare exotics to have a long list of plants delivered to him every year, that have *damped off*, as the phrase is (not *killed off*) to the value of, perhaps, many hundred pounds. This he looks to as to an inevitable evil which he must lay his account to meet with. It is not doubted, that in future this disease will become less formidable than it has hitherto been; possibly, it may come at length to be known only by name.

The experienced gardener, who has attended to the mode of constructing hot-houses above described, cannot fail to have remarked, that these houses would be even more subject to this evil than those now in use; and, had we had no remedy prepared for removing this disease, the proposer never could have thought of seriously offering his designs to the discerning public as an improvement. He, therefore, considers that part of his contrivance which he is about to describe, though it has but little claim perhaps either to novelty or invention, as one of the most indispensable utility. It

may be compared to the Promethean fire, without whose animating influence all the other parts of his invention would have been dead and unavailing; though the members of the object itself be so formed, he trusts, as to admit that animating energy to produce its benign influence in the easiest and most efficacious manner.

The way, then, in which a full ventilation may be produced in a hot-house at any time, without a neceſsary variation of its temperature, is as follows: let a common fan be provided, similar to that attached to the winnowing machine that was introduced into this country some years ago by the duke of Buccleugh, and which is now so generally known as to require no particular description in this place, and one of which may be seen in the repository of the Society of Arts in the Strand, London,—with the following alterations only: let a flexible pipe be provided, having a mouth so shaped as to cover the whole of the aperture through which the wind is forced when the fan is in motion, with a nozzle at the other end of it, by means of which the air that iſsues from it may be directed to any object within the house at pleasure. Let another pipe of a similar sort be provided, one end of which divides into two; and have the termination of these two pipes so formed as to cover the two circular holes around the axle, where the air that supplies the fan must neceſsarily enter; so that, of course, all the air that iſsues from the fan must first be sucked up by that pipe. By means of this simple apparatus, whenever it is put in motion, the air may be drawn from any one part within or without the house, not exceed-

ing the length of the pipe, and instantly transferred to any other part of it; and that with a greater or lefs degree of violence, as shall be best adapted to the circumstances of the case; in the same manner as water is transferred from one place to another with more or lefs violence by the engine for extinguishing fires, whose operation this exactly resembles. To describe all the beneficial operations that may be effected by this apparatus, would greatly exceed our limits; but it may be proper to specify a few of them. The judicious reader will easily see how these may be greatly extended.

First, the temperature of the house may thus be regulated so as to adapt it precisely to the purpose wanted at the time, without any waste of heat. For example: when the sun is shining strong, the heat in the upper region of the house might become such as to prove hurtful to those plants which are placed in it, while in the lower part of the house it might be as much too low. In that case, by throwing down the warm air from the top, and agitating the hot and cold together, this defect would be instantly removed.

Secondly, even without any regard to the plants in the lower part of the house, this kind of commixtion might be made greatly economical in the following way. Though during the day-time, the heat of the sun would be too great for the plants, were it allowed to stagnate in the superior region of the house, yet, it is well known, that it will suffer an abatement while the sun is absent during the night. By agitating the air, then, towards the evening, the hottest part of that air, instead of being suffered to fly off and be lost,

which it otherwise must have been, because it had become destructively hot, is only turned down to the lower part of the house; so that, when the whole is thus mixed, no part of it is too hot for the plants. If that agitation be abated as the cold begins to prevail after the sun is withdrawn, a portion of the hottest part of the air in the house will gradually rise to the top, so as to preserve the same temperature there as when a greater proportion of heated air was in the house; and thus the temperature at that place will be preserved much longer than otherwise could have been done. But,

Thirdly, when it is observed that the smallest degree of damp more than could be wished for remains upon the walls, or glaſs, or any part of the house, that damp may be entirely removed in an instant, by directing to that place a strong blast of air from the nozzle of the pipe. In consequence of the drying power that we thus poſſeſs, the plants may be moistened by steam at any time when appearances shall indicate the utility of it, without any apprehension of evil arising from it in consequence of unfavourable weather; for, the moment that danger is apprehended from damp, the plants themselves, as well as every part of the house, may be instantly and completely dried; so as entirely to remove every apprehension of that noxious disease which hath for ages past proved so destructive.

Fourthly, the air may thus be so agitated, at pleasure, as to produce the same effect upon the plants in the house as wind would do upon them without doors; with this single variation, that it is always in our

power to prevent this wind from becoming too strong, so as to break or otherwise materially to injure the plants: and,

Lastly, to enumerate no more, mephitic gas may, by means of this apparatus, be pumped up at pleasure from reservoirs without the house, where it may be generated, and so distributed as shall be found best to promote the growth of the plants. In particular where they are placed in a bed, as the pine pit, by having the edges of that bed elevated a little, were a stream of that air gently spread along the surface of the mould it would there, by means of its great specific gravity, long continue in a mafs (as above a vat of fermenting liquor), and thus operate as a manure upon the soil, and promote the growth of the plants.

These few hints may be sufficient to show, that innumerable benefits may be derived from this simple apparatus (especially when combined with the other improvements) that have been hitherto deemed altogether unattainable.

Even here, however, our means of ventilating do not stop. The above mode of agitating the air, useful at all times, and indispensably neceſsary during bad weather, would not alone be sufficient to preserve the plants for a long period of time in perfect health. In a long course of time the air in the house would become too much loaded with damp vapours, and be in other respects unwholesome to the plants. To guard against this evil, it will be neceſsary to renew the air in the house from time to time, when the weather is such as to favour that operation. With that view, let the attentive operator take notice when

the morning promises to be fine, and the sun shining clear, to prepare for it in time. To enable him to do that, a set of windows are provided along the front of the house, that admit of being opened occasionally at the bottom only, and of being shut quite close at other times. Along the back, or north part of the house, another row of openings of a similar sort is provided near the top, that admit of being opened, or *close* shut, at pleasure. These openings are placed alternately higher and lower; that is to say, one, we shall suppose, opens quite close under the roof glaſs, and the next one foot lower than that, and so on alternately along the whole house. [It is unneceſsary here to detail the mechanism by which these are made to close and open.] When the day is fine, and the sun operating powerfully in the house, let the lower windows in front be all opened, and the lowest tier of windows in the back be opened at the same time. Under these circumstances, the air that was formerly in the house will be rarefied, and all that part of it which is below the level of the higher windows, now open, will be gradually carried off, and its place instantly supplied with fresh air. During this part of the proceſs, the vines along the roof *glass* will sustain no abatement of heat, or change in any respect, because they continue immersed in a stratum of air of the same temperature as before. If the weather be extremely cold, it will be advisable to go no farther at this time; for, enough has been done to remove all danger from noxious air, five sixths at least of the whole being thus renewed. Care, however, should, under these circumstances, be taken to close the windows early; so that

the sun may have time to heat the whole sufficiently before he withdraws from it. If, however, the season be warmer, and the weather fine, the lower tier of high windows should be closed, and the higher tier opened; in consequence of which all the cold air, which is at this time in its hottest state, will instantly make its escape through these openings, and its place will be supplied by clean air from below. The ceiling may now be washed, and purified more or lefs as circumstances shall indicate; but in all cases the apertures should be closed so early as to allow time to bring the heat up to its proper standard before the sun withdraws.

The attentive reader will now be able to perceive, that by means of the first kind of ventilation every part of the house, and the plants within it, can be at pleasure, and under any pofsible state of weather, dried so as to remove all apprehensions of the hurtful effects of damp; and otherwise agitated, and the different ingredients in the air mixed together, precisely as takes place at all times in the open air; and that by the second the air within the house can be renewed and perfectly sweetened whenever a fine day comes at any season of the year, without danger of injuring the plants by a hurtful abatement of the temperature of the house.

He will likewise observe, that the upper chamber may by means of the fan be ventilated at pleasure, totally independent of the lower chamber, or connected with it, as the operator may judge proper; and that the air can also be changed in it, and completely washed at will, by opening a pipe or pipes outward

from the higher part of the house; and that this also may be done without affecting the lower chamber, merely by lengthening the pipe *g h*, by putting another piece to it, as is done on the nose of a watering-pot, so as to bring the lower end of it near to the ground; or, during extremely cold or stormy weather, the lower chamber may have the whole of its heated air washed off and carried into the auxiliary chamber, merely by shortening the pipe, as above described, till the lower mouth of it comes equal with the glaſs. The air in the house is susceptible of many other modifications by means of these contrivances, which it would be tedious to enumerate.

After having shown in what way the heat of the sun may be managed with such economy as to render the use of artificial heat neceſsary for very few purposes only, and moisture employed in abundance without any danger of damp, it now only remains that I should show in what manner those plants which are principally cultivated in this country under glaſs (stove plants excepted) may be trained so as best to receive the full benefit that may be derived from houses on this construction. These are vines, peaches, cherries, and leſser fruits; with some esculent plants that are wanted earlier or later in the season than they can be obtained without artificial shelter.

VINES.

The proper culture of the vine was never understood in this country till Mr. Forsyth, of Kensington, in consequence of that accuracy of remark which so peculiarly characterises him, discovered the true prin-

ciple upon which the pruning of that plant depends, so as to bring it into a train of abundant and never-failing productiveneſs. This is, simply by cutting down the wood that has borne fruit, so close as to leave only one shoot to spring from it the ensuing season, which neceſsarily produces a strong shoot; and to suffer that shoot to run to its whole length during the summer season; never shortening it at all till the winter pruning, and then only cutting off that raw unripened wood at the point of the shoot which would be killed by the cold in winter. These shoots, if nailed in at their whole length in those kinds of vines generally cultivated, provided the soil be suitable to the plant, will, with scarcely any exception, produce on an average two full-sized bunches of grapes from each eye; and after they have completed that year's growth, *the whole of that shoot, with all its branches,* should be cut down to one eye, from which a strong shoot will be produced for the purpose of forming wood only that year, and of bearing fruit the ensuing season; and so on.

The above, in few words, are the eſsential particulars that constitute the basis of that inimitable management which has been introduced by that justly-celebrated horticulturist. It is no part of my intention to enter into any farther particulars respecting this article, than merely to show in what manner these simple principles may be adapted in practice to houses constructed on the principles of the patent. Because, without a knowledge of this, it will not be in the power of any person to see how it is poſsible to produce the quantity of grapes that has been hinted at in the original advertisement concerning these houses.

From what has been above explained, the attentive reader will have remarked, that, under this management, two years are required to complete the wood and the production of the fruit on each shoot of the vine (for as to the one, two, or three bunches that the strong wood shoot may produce the first year, these are accounted nothing); and that during the first of those two years that a shoot is suffered to remain, it is the growth of the *wood* only that is to be adverted to; and the production of *fruit* only in the second: and, as the vine plant *grows* perfectly well in the open air in this country, the shelter of glaſs is required for the maturation of the fruit only during the *second* year. The vines for our purpose, then, ought to be so trained, as that no part of the *first* year's shoot should ever be admitted into the house; in consequence of which, not a twig would ever be found within the house that does not bear one, two, or three bunches of grapes; so that the house will be thus freed from every uſeleſs incumbrance.

To effect this, the vines ought all to be planted in the earth on the outside of the house. Each individual shoot should be permitted to rise directly from the ground, without being suffered to divide until it reaches the height of the opening into the house, through which it is intended that the vine is to be paſsed into it. This shoot, being supposed to be of a sufficient degree of strength (of one year's growth we shall suppose), should be cut over at that height; and when it begins to push, rub off the whole of the buds save one only at the top; and this shoot should be allowed to grow to its whole length that season without

doors. Each alternate shoot is to be managed after the same manner (the intermediate shoots being supposed to be taken into the house during that season). The shoots may be trained without doors by means of a trellis or espalier, on which, after being suffered to rise upward, they may be carried forward in a horizontal direction, forming, if you shall so choose it, a covered walk, on the sides and the top of which the vines will enjoy the full benefit of the sun and air without being over-crowded with useleſs incumbrances, so as to perfect the wood during the season. At the proper season during winter, the watery tops of these shoots may be taken off; and when it is judged proper to take them into the house, they should be loosened from the espaliers, and carefully carried in, one after the other, through the openings provided for that purpose.

If the lowest chamber be intended to be employed as a vinery, the vines may be introduced either through low holes left for that purpose at the bottom of the upright glaſses, or through openings above just under the roof glaſs, as shall suit the inclination of the owner of the house. In the first case, it can only be on the north side of the house, because the shoots must go upwards to the roof glaſs *within* the house, which would too much obscure the lights on any other side except the north. If it be intended that they should be introduced immediately under the roof-glaſs (which must always be the case on every side except the north), the stem must be carried first to that height, and there, instead of being cut over, let it be bent as nearly at right angles as can be done without breaking

it, and that bended part cut over when it reaches from one upright to the other. All the eyes below the bended part should be then rubbed off, and those above it left to produce wood. The use of the form here recommended is, to admit of introducing a sufficient number of shoots under the roof-glaſs, without darkening the upright glaſs by many stems going up the outside of it; for, one stem is sufficient for one window (it might, indeed, be made to serve *two* with the greatest facility, as is too obvious to require to be particularly described), and that stem may be carried up on the outside of the upright. Under this arrangement, the shoots of the first year would be more weakly indeed than could be wished; but, after once cutting, or twice at the most, they would be as strong as could be desired.

It is unneceſsary in this place to describe in a very particular manner the way in which these openings are to be formed: it is sufficient to say, that they admit of being shut quite close after the plants are let in, so as not to derange the economy of the house.

The vines, when taken into the house, ought to be stretched in parallel lines immediately under the horizontal roof glaſs of the house, and fastened to wires placed at convenient distances all along for that purpose. The side shoots, which produce the fruit, when they push out, may be laid in on each side between them in the same direction. The claspers will soon fasten to the leading shoots and the wires, so as to support the bunches of grapes; which, as they acquire weight, will hang down to a small distance, suspended freely in the medium of heated air. The leaves above them

will shade them from the overpowering influence of the sun's rays, and thus suffer them to swell kindly till they attain their fullest size. It is only when they have nearly attained their full maturity, that a few of the leaves may, perhaps, be removed; but this ought to be done with caution. Should the bearing-shoots grow too luxuriantly (which they infallibly will do if the wood-shoots have been shortened too much) so as to shade the fruit more than enough, the points of these shoots may be nipped off from time to time so as to moderate this evil; and shoots springing from the *axillæ* of the leaves should at all times be carefully pulled off.

If the house does not exceed from 30 to 35 feet in length, and if no other house joins it, it would be advisable to plant the vines at the two ends rather than the south or north side; for in that case the shoots would easily reach the whole length of the house, if the vines be in health, and of the free shooting kinds. Should the house be longer, it would still be advisable to have vines at both ends; a few being planted at the north or south side of the house towards the middle, to close up the vacancy, should any there remain. If the house does not exceed 16 or 18 feet in width, the shoots will easily stretch acrofs it.

When the grapes are gathered, some persons think that the wood might be withdrawn from the house entirely, and suffered to make its farther progrefs for that season in the open air: and, as the *whole* of the wood that was in the house is to be entirely cut off at the end of the season, I am strongly inclined to be of that opinion myself; but, as some other persons think

this would prove prejudicial to the vine, I am far from afserting that it would be otherwise, as I have had no experience to the contrary. I therefore leave this point to be determined by future experience. If that shall prove that the practice would be safe, let them be then withdrawn; this will leave the house free for other purposes. Should it turn out otherwise, the house may at any rate be freed from them as an incumbrance, so as to leave it open for other purposes, merely by loosening the bindings, cutting the tendrils from the wires, and then lowering the whole for two or three feet from the roof, allowing it to rest there upon supports placed for the purpose. There it will live in a medium somewhat cooler than if it had been suffered to remain in its place; and the best part of the house will be left free for cucumbers or French beans (runners) during the latter part of the season.

[*To be continued.*]

To the Editor of Recreations in Agriculture, &c.

SIR,

THE complaint that we have too many publications on the subject of morals or manners, however reiterated, ought not in all fairneſs to be admitted, until it shall be proved that there are too few persons to require their afsistance. Criticisms and strictures on these subjects cannot be multiplied faster than the varieties of whim and fashion; and, instead of blaming the frequency of books, the authors of them ought to be pitied, since they are obliged to leave the retirement of a studious life to pick up a know-

ledge of such facts as may prove that they are not entirely indebted to imagination.

It is doubtleſs within the memory of many of your readers, that formerly it was the fashion to advise young men to avoid singularity, and it was then the particular study of mankind to be what was called neighbour-like. Good as this advice might have been in the abstract, it was attended with inconveniencies. Men, in avoiding singularity, frequently took up with absurdity, or even were partakers in vice, "following a multitude to do evil." It became very neceſsary, therefore, to form a right idea of singularity, and to know when it was laudable and when vicious; and it was stated by a very popular writer of former days, that singularity is vicious when it makes men act contrary to reason, or when it puts them upon distinguishing themselves by trifles. And in this opinion, I believe, the generality of mankind have been long agreed.

Of late years, however, it has become neceſsary to guard against a new species of singularity, or rather the appearance of a newly revived sect of oddities, who seem to rest all their fame and reputation with the world on certain out-of-the-way habits and practices. Conscious, perhaps, that they have no intrinsic merit to attract the attention of mankind, no extraordinary degree of goodneſs, and no prospect of greatneſs to draw the public eye upon them, they aspire to be marked out for some oddity of opinion, of dreſs, or of the mode of living, which may be frequently mentioned in conversation, and consequently obtain the distinction of which they are ambitious. The Spec-

tator has given us the portrait of a man of this cast in his days, who never had any stated hours for dinner, supper, or sleep; and, among his other whims, who would rather be thought a malecontent than drink the king's health, unleſs he was dry. But that such characters were not common at that time appears from this, that the gentleman had a commiſsion of lunacy taken out against him, which in our days would perhaps be thought a very severe, as it certainly would be a very *common* punishment.

The first symptom I have observed among our new species of singular characters, is a conceit that they are much wiser than the rest of the world; and, as it is difficult to prove a superiority of this kind by internal evidence, they have recourse to such outward signs and symbols as, they tell us, infallibly mark the "philosopher," and the "man who has got rid of vulgar prejudices." The principal of these is slovenlineſs, with its usual accompaniment, a deficiency in cleanlineſs. The hair, instead of being subjected to any regulation from the comb, is either entirely left to its natural appearance, which in grown persons is not always very pleasant, or is cut almost quite close to the head. This last is reckoned a never-failing evidence of "liberal principles," and you rarely find a man who pretends to have struck out new lights on the subjects of religion, morals, or politics, whose head does not very much resemble a block.

If we descend from the head, we shall find the other parts of the body *decorated* with an equal *deficiency* of *ornament:* it would appear that extraordinary genius is incompatible with a new coat, and that a talent above

the vulgar cannot be exercised in clean linen. Something of this affectation of singularity may be traced to very ancient times. When Antisthenes was the scholar of Socrates, he affected to wear a mean habit; and, having one day turned the torn part of his garment outermost (which in our days would be deemed a fine trait of singularity) Socrates censured him for his *vanity*, or, as Ælian has it, his *ostentation*.

Whence it comes about that dirtineſs is supposed to be in alliance with superior wisdom, can only be accounted for by those who have endeavoured to evince that alliance in their own person. Still one who has not forgot the comforts of frequent ablution, and the benefit of having credit with a tailor, will be apt to undervalue a singularity which, when philosophers have adopted, they cannot keep to themselves. There is nothing difficult in dreſs but what is expensive; and surely to be ill-clad and to be dirty is within the power of thousands who are not ambitious of being thought wiser, and only regret that they are poorer than the rest of mankind. And if we consider it as a species of vanity, which many suppose it is, we must also reckon it among the most extraordinary lapses of the human understanding, that men should be most vain of what affords least pretence, and look upon that as a distinction which the majority feel as a disgrace.

Since the commencement of the unhappy disputes occasioned by the French revolution, we have beheld a succeſsion of these singular characters *undressing* themselves into notice by what generally used to excite disgust. Were one to talk seriously to them, it might not be amiſs to remind the wisest of them,

even in the plenitude of their conceited superiority, that one of the finest compliments ever paid to sir Isaac Newton is by that biographer who observes that he was not distinguished from other men by any singularity either natural or affected. It would, indeed, have added nothing to his fame, to have had his head close shaven, or to have worn a gray hat, and a black shirt. It was not the fashion in his days for men to carry either their talents or their principles on the outside; and, wherever this is the case, there may be reason to suspect that what can be so easily put on may be as easily put off. Sir Isaac was the most learned man of his day, and the greatest philosopher, but he was not the worst dreſsed, and, it is generally believed, owed no part of his reputation to a talent for exciting disgust.

I was drawn into these reflections the other day, partly from an expreſsion used by a friend, when a certain dignitary of the church paſsed us in the streets —one who has acquired no little celebrity by the *forma pauperis*, and who, with a liberal fortune, and a high rank, seems unable to supply himself with the common neceſsaries of life, particularly "raiment to put on." My friend observed this was nothing extraordinary: when at college he was always the dirtiest fellow there, and has kept up the distinction in every paſsage to his present rank. Although, therefore, the *new philosophers* have the merit of introducing the singularity of slovenlineſs, they have not been able to monopolise it; and really, if these gentlemen were desirous of being distinguished upon rational principles, it would be their interest to attempt something leſs

common than rags and filth. Distinctions are valuable only as they are inimitable; and, if we are to adopt fashions to be looked at, we should surely trace them in some more recondite source than the parish workhouse or the preſs-yard.

Had this love of singularity, however, contented itself with affairs of dreſs; had it spent itself upon the wardrobe, and affected the outward man only, it might be an object of ridicule, but perhaps would rarely have excited serious contempt. Yet, when we consider that singularity is a paſsion that branches out into various ways, we are inclined to suspect that it is not satisfied to make its votaries *dress*, but even to think and speak in an out-of-the-way manner. I am almost of opinion, that most of the strange opinions in religion and morals which have lately been obtruded on the good sense of the public under the name of philosophy, are merely the offspring of the vanity of singularity, when men suppose that to think differently from the rest of mankind is to think more wisely, and when the effusions of the imagination paſs for the convictions of the understanding. Certain it is that many of the infidel and immoral writers of our day have owed their fame entirely to the singularity and oddity of their opinions, and not to the arguments from which they are deduced, and which have been found without proof, or from the object to which they have tended, which has generally been of the mischievous sort.

There is one misfortune, however, which attends the affectation of singularity both in dreſs and opinions, which is, that it is never lasting. Opinions that are distinguished chiefly for their absurdity, first excite

surprise, then ridicule, and then are forgot: and, with respect to dreſs, the very eſsence of singularity in dreſs consists in variety. What is always seen, and in all places, is seen with indifference; and perhaps future biographers, in handing down our *great geniuses* to posterity, may not think it worth while to record their contempt of cleanlineſs, and their attachment to vermin. And if such *principles* as these are not handed down to future ages, what a fleeting vapour is *fame?* And how weak the ambition that nobly puts in a dirty shirt as a claim for posthumous reputation?

I ought not, however, to close these desultory remarks without acknowledging, that those who are desirous of obtaining a character for singularity may yet obtain it upon very honourable terms. There are not wanting general opinions, general habits, and general practices, from which it will be meritorious to diſsent. There are occasions, says a modern writer, on which it is noble to dare to stand alone. To be pious among infidels, to be disinterested in a time of general venality, to lead a life of virtue and reason in the midst of sensualists, is a proof of a mind intent on nobler things than the praise or blame of men, of a soul fixed in the contemplation of the highest good, and superior to the tyranny of custom and example. I am, sir, your humble servant, MEDIUS.

On the origin of Feudal Institutions, and their subsequent modifications.

[*Continued from page* 114.]

FROM the view that has been given of that state of society to which the feudal institutions owe their rise,

it will appear that the whole mafs of the inhabitants of each of these countries might be arranged under two general clafses, viz. free-men, and slaves: that the *firft* included the whole body of conquerors, who alone were entitled to bear arms; and that these consisted of *chieftains* (or, as we might now call them, officers) of different ranks, and inferiors under their command, in a species of civil subordination similar to that of an army; and that the *last* clafs, or slaves, consisted of the general mafs of the former inhabitants of the country, who, having been deprived of their property, and reduced to a state of servitude, were, from principles of self-preservation, neceſsarily disarmed, with a view of rendering them as little as poſsible capable of giving disturbance to their rulers. At the first, we may naturally suppose, that these enthralled persons would submit to the yoke with great reluctance, and would therefore require to be watched with the greatest care; but, as time effaced the idea of former independence, they would learn to submit to their fate with that kind of unaſsuming resignation which neceſsity never fails to produce. Few struggles for superiority would be then experienced; and, as the only mode of raising themselves to consequence would be, that of conciliating the favour of their superiors, there can be no doubt that they would be induced to attempt this by every kind of suppleneſs of behaviour and humble demeanour that they could devise. Thus are we enabled to trace the causes of that striking inequality of ranks which so peculiarly characterised the feudal institution, and the natural progreſs of ideas among a people who, at one period of their history, were distinguished by

equality of rank and unlimited freedom, to that state in which the greatest despotism (in one sense of the word) and the most disgusting inequality of rank prevailed.

But although this despotism, with regard to the unfortunate objects of their domination, so cruelly prevailed; yet their ideas, in as far as respected their own order, continued in a great measure unchanged. The subjected tribes were, in fact, considered by them as inferior animals, and were not even numbered among men. In every public deed respecting government, they were considered as nothing; so that, in their regulations, they were, in general, wholly overlooked: a privilege to which *every man* was entitled, was never then understood to extend to them. It meant only every *free*-man; and numerous are the mistakes, and great the misrepresentations, that have been made by future writers, from their having overlooked this distinction. Yet this distinction is not entirely unknown even in our own days: how many persons consider the negroes in European colonies as a species of beings totally distinct from themselves, and think that, however necefsary it may be to guard the rights of white (free) men, it would be ridiculous to think of entertaining any idea of that sort respecting negroes! Thus does power at all times tend to influence the judgment of man, though it may be made to exert its influence under an infinite diversity of modifications.

As all wealth, at the period of time now under consideration, consisted in territorial pofsefsions, and those animals (including men) that were necefsarily attached to them, and as *power* so directly depended upon these

poſſeſsions, we may easily trace the idea of *honour* that was attached to those persons who were owners of land: an idea, the vestiges of which still remain in Britain, although, from a change of circumstances, it hath already greatly declined, and will gradually continue to lose ground, until some other change in the never-ceasing revolution of human events shall once more bring it into vogue under a difference of form, which we might in vain at present attempt to comprehend.

But, although the lands of the conquered states were in general seized by the conquerors, and distributed among the chieftains, under the honourable distinction, as it was then considered, of military tenure; yet some small portions seem to have been bestowed upon the original owners, who had probably obtained the favour of the conquerors, either by not opposing, or by favouring their enterprises; but, although these persons were allowed to keep poſſeſsion of their lands, it was not thought prudent to admit them to the privilege of carrying arms; and therefore they were denied the honour of military tenure. Such, at least, I conceive to have been the origin of that kind of property which was termed *allodial*, the holders of which were subjected to no liege lord; and, as they were not liable to the burden of military service, so neither were they entitled to the privileges annexed to feudal tenures. In the earlier part of the feudal institution, allodial poſſeſsions were numerous; and the owners of them must have been protected in their poſſeſsions by laws, or customs, or institutions, of a nature that now in a great measure eludes our researches; but, what-

ever these have been, it is obvious from events that are well known, that they must have been found inadequate to the purposes wanted; for, as the great *feudal lords*, or tenants in *capite*, had alone the power of enacting laws and influencing government, and as they exercised a power in the respective districts where their property lay proportioned to the extent of their poſseſsions, and the number of their vaſsals, it was soon found, that no title to property could be deemed secure, except that which was under the protection of some powerful feudal lord: hence it became expedient for allodial proprietors voluntarily to resign their title to that tenure; and a new charter was obtained by the former proprietors in consequence of a fine levied for that purpose; in consequence of which they became feudatories of some powerful lord, under whose protection they enjoyed a more comfortable sort of existence. In this way allodial property came gradually to disappear among nations, so as to be scarcely known but by name.

As government is not natural to man, being merely an artificial device, calculated to correct the evils that inevitably spring up in every kind of civil society, it will neceſsarily follow that every political institution must be at first very rude and imperfect.—No provision can be made to remove evils to which the state of society, at the time, could not have given birth; nor can any attempt be made to correct abuses, till these abuses shall have prevailed, and the ill effects of them have begun to be felt. In the early periods of society, therefore, the administration of government must be in all cases rude and imperfect; and if it would be a vain attempt to discover what it really was

at a very early period, it would be equally absurd to recur to these first attempts at forming what we now call a constitution of government, as a model of political perfection, by which the good or ill of future institutions might be estimated. In attempting, therefore, to trace a slight outline of the gradual progress of the British constitution, it is not my intention to inculcate the absurd idea of bringing it back to its original state. Political regulations ought in all cases to be suited to the state of society at the time they are made. The institutions that might suffice for a few savage roving tribes, would but ill accord with a civilized, agricultural, manufacturing, and commercial people.

Mankind, as they come from the hands of the creator, we shall admit, are all equal in respect of rank;—but nothing can be more diversified than they are in regard to natural talents, personal endowments, and instinctive propensities: so that in every possible case, where men associate together, a distinction of rank will instantly take place. By distinction of rank, I mean a difference in regard to the respectability with which one man is beheld by the general body of the people when compared with another. One man is active, industrious, enterprising; another is indolent, slothful, and sluggish. The first provides for himself stores of the necessaries of life, whatever they may be; the last neglects this important duty. This last, however, feels he must be fed, and lodged, and clothed; nor does he find any method of obtaining these so easy as offering certain services to the first. He becomes a humble dependent, or retainer; by whatever name

you please to denote it;—an inferior personage to the first. He is, in short, of an inferior rank to the man who supports him. To this man he looks up as to one of a superior nature; he feels himself obliged to respect the children and other connexions of the superior; and the children and dependents of the inferior person feeling, at an early period of life, their wants and dependence, when compared with the other, cannot fail to do the same. It is in this way that a difference of rank must in all human societies be instantly perceived; nor is it in the power of any human device ever to prevent it. If liberty be given for the human faculties to be fully exerted, this cannot be avoided.

Now, if certain individuals must ever poſseſs a greater respectability than others in every society, it will follow that these individuals will have more influence in that community than others, and they will become leading men in all public deliberations; or, in other words, men of high rank. Their opinion will have influence in the national aſsemblies; and, wherever an enterprise of great difficulty is to be achieved, or a public trust of great importance is to be discharged, these popular persons will be entrusted with the charge of executing it. They will, in short, become the supreme executive officers of the state;—in other words, the highest will be the king.

In the infancy of societies, it is true, public acts of executive administration will be so seldom required, that neither will the national aſsemblies be frequent, nor will the want of a supreme executive officer be felt but upon uncommon emergencies occurring. On these extraordinary emergencies alone, therefore, will

a supreme executive officer be wanted; and on these occasions the most popular person will be called upon, without any particular form or ceremony, to discharge that particular duty; nor will it be understood, either by himself or the community at large, that he is to intermeddle in any other affair than that for which he was appointed. If he does this in a manner that is generally approved, he will naturally be called upon on any future emergency of a similar nature while he lives. During this stage of society, influence is merely personal; nor have men as yet acquired any idea of hereditary precedence. No regulations, therefore, can as yet be made with a reference to this unknown order of things. Power has hitherto been always voluntarily conferred; no idea has yet taken place that an attempt could be made to extend that power farther than was intended; so that no regulation can have been adopted to guard against this evil. The people hitherto have met together by a sort of unanimous accord, when extraordinary emergencies called for it; nor have they as yet thought of any special regulations that should be adopted respecting this particular.

By degrees, however, this order of things must be altered. A man who has been often exalted to the supreme command comes to be considered as enjoying it for life; and, as the society increases, and public affairs become more numerous, it at length becomes neceſsary to have a person invested with a permanent authority to watch over these affairs. And as it would be inconvenient to be calling a national aſsembly to deliberate on every particular affair, this permanent executive officer is entrusted with certain discretionary

powers to act from his own authority. These, at the first, will seldom be abused; nor will any provision be made to guard against these abuses. Every individual rests satisfied with the idea that the officer may be turned entirely out of place whenever his conduct becomes disagreeable; and no provision is yet thought of to guard against the improper exertions of power. In this stage of things the first magistrate may be considered as elective, and his office comes tacitly and imperceptibly to be held for life, without any expreſs regulation for that purpose.

The person entrusted with this power will gradually perceive the great influence it gives him in society. By the emoluments he has to dispose of, by the favours he can confer, his influence is gradually extending. He thus acquires a set of dependents and retainers, who, from motives of convenience, and hopes of favours, become attached to him and his *family*. Other men of eminence perceiving this, aspire at power.—They court popularity, they form parties, and try to get a majority of votes in the national aſsemblies. Intrigues begin to be formed for the purpose of accelerating or retarding these meetings, and for obtaining a greater number of voices at them.—Now, it comes to be discovered that the rude and inaccurate mode of convocating these aſsemblies, and of voting by acclamation, were not sufficiently accurate, and that particular rules should be prescribed, and adhered to in the meeting of these people.—Their powers, as well as that of the executive officer, begin to be defined and limited; and the rudiments of something that might be called a constitutional form of govern-

ment begins to be faintly perceptible.—In this state of society the regal authority may be said to be firmly established for life, though the appointment to it be elective.

During this state of things, it may sometimes happen, from accidental circumstances, that the power of different families will be so nearly equal as to prevent any one of them from obtaining an established claim to the supreme authority for a long time; and the crown will be still elective: but in general some particular family will acquire the ascendency; the princes will be so often chosen from that family, that it will be considered as in some measure exclusively entitled to the crown; and in time it will become entirely hereditary, without any attempt at an election, or a particular nomination for that purpose.—This, however, can seldom happen, except in those cases where circumstances have rendered the convocation of the states troublesome and burdensome to the people at large; that is, where no particular regulations have been adopted for distinguishing the people into different clafses, and by exempting the inferior orders from the trouble of attendance, forming a convocation of a smaller number of the superior orders, who, with a view to preserve their own dignity and importance in the state, will not grudge the trouble that such an attendance requires.—Wherever this circumstance has not been adverted to, the meetings of the people have been gradually discontinued; the regal authority has gained ground. In those cases the king has not only been vested with an uncurbed power of executive administration, but he has also afsumed a right of legis-

lation, so as to become despotic.—Such is the gradual changes that an inattention to the varying situation of things neceſsarily produces.

In most of the countries of Europe, this circumstance having been overlooked, the form of government has suffered various changes, all verging towards despotism in a leſser or greater degree; so that the *constitution*, as we now call it, of these states, has aſsumed a great diversity of forms. In Germany, for example, the parliament, which originally consisted of all the tenants in *capite* of the empire, being a body too vast and unwieldy to be convened in any one place, and too numerous to admit of entering upon any serious deliberation, has now been brought at length (by a series of changes which it might prove interesting to trace, but which would far exceed our limits) to aſsume the form of what they call a *diet* of the empire, in which seven sovereign princes have alone a right to vote; each of whom exercises a despotic power, under a diversity of modifications, in his own private domains. In the Italian states, scarcely any vestiges of the national council now remain. In Spain and in Portugal, the national council, under the name of *cortes*, is but a shadow of an institution formerly of great power, but now of the utmost insignificance. In France, under their late princes, the *parliament* so called was rather a court of judicature than of *legislation*; in regard to which last capacity it had long exercised no other power than that of trying to put a feeble negation on the decrees of the prince; and the meeting of the *notables* was only a ridiculous attempt to revive an institution whose vital energy had been long ex-

tinct, by attempting to carry into practice in one state of society institutions which were only adapted to another, and which, of course, produced an explosion, as might have been expected, that totally deranged the whole system of political economy, without having power to substitute any thing consistent in its place. Such was, and ever must be, the consequence of an unadvised attempt to recur to what some people call the *first principles* of a constitution, after those principles have become inadequate to the actual state of society. Should any person who poſseſses a discriminative talent in an eminent degree, and a steadineſs of principle that would enable him to follow truth with undeviating steadineſs, ever undertake to develope with a distinct precision the circumstances that have occasioned these diversities, he would oblige the world with a political work of inestimable value; but this is one of those bleſsings which we may rather wish for than hope to obtain. In this disquisition it would be found that religion would bear a conspicuous part; as it has been employed as the instrument of great changes in civil institutions, which have proved at some times highly beneficial, and others, greatly prejudicial to the peace and comforts of mankind.

In other cases, however, where accidental circumstances of usurpation or competition have taken place, so as to render it neceſsary for the competitors for power to court the popular favour, this great evil has been avoided; and to this peculiarity Britain in particular owes that fortunate constitution of government, which so happily distinguishes her from all other nations. Some of the most striking features of this con-

stitution I shall endeavour to delineate in a succeeding eſsay, and mark the changes that have taken place with respect to this object within the æra of certain history; an object that ought to attract the attention of every British subject, if he wishes to reason consistently on many of the topics of public discuſsion that daily occur, or act with propriety in endeavouring to secure to posterity those invaluable privileges on which we with so much justice plume ourselves.

In the mean while, it was judged proper to give this sketch of the natural progreſsion of government, not only to point out the remote origin of many of those institutions we now so properly value, but also to give some slight notion of the causes of those striking differences in the forms and eſsentials of the various governments in Europe, which are evidently now so diversified in their tendency with regard to the liberties of the people and the powers of the king, though they all most obviously derive their origin from one common source, as it tends strongly to inculcate a maxim that never ought to be lost sight of by any people who value their liberties, viz. *That it is by carefully watching the progress of the ruling powers at present, and by guarding against the effects of modern encroachments that the circumstances of the times may not render very unpopular, and by this alone, that the essentials of freedom can ever be preserved.* It would be easy to show, did our limits permit, that every step in the progreſs of despotism has been effected by encouraging changes that the indolence of the people, or the particular bias of their prejudices, made them tolerate at the time as a sort of indulgence,

in which they were well pleased to acquiesce. It is not by violent steps, but by imperceptible gradations that despotism has ever been established among a free people. It is by corruption, often clothed under the most patriotic pretexts; by cajoling the people with specious arguments; by allaying the fears, and soothing the vain propensities of the vulgar, that designing men have established their power, and not by openly attacking the privileges of the people. It is the smooth and the crafty politician, and not the outrageous tyrant, whose operations ought to be chiefly regarded by those who are the guardians of national freedom.

Of the constitutional history of Britain, during the time of the Saxons, few particulars can with certainty be known; but from incidental circumstances it may easily be inferred that the constituent members of legislation and government were neither well understood, nor their respective rights and privileges accurately defined. The very deed upon which William the Norman founded his claim to the British throne (the will of Edward) is, alone, a sufficient evidence of these facts.

After the conquest, the history of England is involved in less obscurity; but every fact upon record, respecting the constitution, serves to prove that our forefathers were then entirely in the dark with regard to many constitutional privileges, now fully ascertained; and that they only gradually groped their way, correcting errors as they came into view, and supplying defects when they were felt, till, by imperceptible degrees, that goodly establishment was formed which we with justice admire: not as perfect, indeed, but as one

more complete than any other which has hitherto appeared, and which, by attention and care, may be still brought nearer and nearer to that perfection we inceſsantly ought to aim at. It is not, therefore, by looking back, and implicitly striving to adopt the imperfect institutions of our forefathers, as many persons have aſserted, that our constitution is to be improved; but by looking forward towards still higher attainments, that we ought to proceed. This will be fully proved by the few facts that follow, which might have been made ten times more numerous, did the limits of our work permit.

NATIONAL COUNCILS HOW CALLED.

So indefinite were the ideas of mankind with respect to the great national aſsembly, that it did not, even till a very late period, receive a distinct appropriated name. A seſsion of parliament has been denoted indifferently by the names *curia regalis—curia imperiales—curia solennes—curia magna—congregationis—concilium principum—concilium generale—conventus—conventus generalis—conventus publicus—placitum—synodum*, &c.;—and in Germany, where the same system of government prevailed, *solius Germaniæ concilium*. It is now there called *Diet*; in Britain a *Parliament*; in France a *National Assembly*, and in Spain and Portugal *Cortes*.

The constituent members of that national aſsembly were in like manner indifferently called *populus—principes—proceres—primores—duces—patres, &c.*—scarcely any thing, in short, was fixed and ascertained respecting them.

MODE OF HOLDING PARLIAMENTS.

They were not more uncertain as to the name, than they were indeterminate as to the mode of holding their parliaments. Nothing is now better understood than that the king cannot be present during the debates in parliament, and for good and obvious reasons; but for many years after the conquest this regulation had evidently not been adopted. Thus, in the year 1194, Richard I. sat in his parliament at Nottingham, and along with him, as many aſsert, his mother Eleanor also,* when he demanded a supply of his nobles for the prosecution of the holy war.[a] Again, in the year 1246, king Henry III. having summoned a parliament to meet at London, conferred with the bishops apart, the earls and barons apart, and the abbots and priors apart, in order to find out their several sentiments respecting the buſineſs under consideration.[b] Even as late as the year 1297, in the 25th of Edward I. the following remarkable conversation is said to have happened in a parliament holden at Salisbury, which gives a very curious picture of the manners and spirit of the times. "The king insisted that most of the nobility there present should attend him to the *French* war, but many excused themselves; whereat Edward, being greatly moved, plainly told them that they should go, or he would give their lands to those that would." The nobles were very much offended at this bluntneſs in the king; and some of the chiefest, viz. the earls of *Hereford* and *Mareshal*, told the king that they were ready to attend him if he went in per-

* This was evidently a remain of the old practice in Germany.

[a] Parl. Hist. v. i. p. 17. [b] Ibid. p. 47.

son, otherwise they would not go. The Mareshal added, that if the king went, he should willingly attend him in his wars, and take his hereditary post in the vanguard of the army. But, says the king, *You shall go, whether I go or not. I am not so bound,* quoth the earl, *neither do I purpose to go without you.* The king then, in a great rage, said, *By God, sir earl, you shall either go or hang. And, sir king, by the same oath,* replied the earl boldly, *I will neither go nor hang.* And so they both left the king abruptly, without taking any leave, and the parliament broke up without doing any farther business.[c]

From this, to us curious, conversation, we are led to perceive, that at that time, and we may conclude still more so at former periods, the law of parliament, like the *common-law* of the land, was the result of practice that long experience had sanctioned by general approbation, rather than any positive law prescribing it, and was accounted binding on all parties. This is precisely what might have been expected, and what must ever take place in the infancy of society. What is generally recognised as useful to the whole, will be quietly acquiesced in as binding upon them without any positive enactments for that purpose. When inconveniencies are experienced from a change of circumstances, and doubts arise as to the limits to the extent of certain customs, it then becomes necessary to enact laws to limit and define these; and to this circumstance we are to look for the origin of statute law. The present conversation is an apt illustration of the manner in which contending passions and

[c] Parl. Hist. v. i. p. 105.

interests give rise to positive enactments tending to limit the extent of regal power. It was evidently not the meaning of our forefathers, to grant the power of commencing *offensive* military operations without the common consent, though it does not appear that such limitations were thought requisite in case of armaments *for defence*; and it was the consciousness of this defect in the exertion of the power of our monarchs, when they wished to subdue France, that induced our kings to endeavour to obtain by *voluntary* consent at future times certain favours in commutation, as it were, of those disputable rights which they claimed, that laid the foundation of most of those privileges of the people which in later times have been opposed to exactions that were declared illegal, which established those liberties that characterise with such peculiar energy the constitution of Great Britain.

CONSTITUENT MEMBERS OF THE GREAT COUNCIL.

If the forms of procedure in business were then vague and ill ascertained, in regard to the royal person, the practice was still more indeterminate for many centuries with respect to the constituent members of that assembly.

It is well known, that during the reign of the first princes of the Norman line, the barons, or tenants in *capite*, and the clergy alone, were summoned to parliament, and that it was only at a later period, and to serve particular purposes, that the knights of shires and burgesses were summoned to parliament.

During the reign of Henry I. several meetings of

the *great men of the kingdom* were called, the most remarkable of which was that in the year 1106, when his brother duke Robert came over from Normandy on a visit to Henry, who, dreading that he would lay claim to the crown, summoned the chiefs of the realm to meet him, when he cajoled them with a smooth speech from the throne, the first royal speech in parliament that is preserved on record. But this, and other assemblies held by this king, only consisted of the clergy and barons.* The same may be said of the conventions called by Stephen and Henry II. which last summoned a great council to meet him at Clarendon, which consisted, according to the distinct enumeration of M. Paris, of the archbishops, bishops, abbots, priors, earls, barons, and nobles of the realm.[d] The parliament summoned by Richard I. to meet him at Westminster, anno 1189, consisted of the bishops, earls, and barons of the realm.[e] *John* summoned his *nobles*, which was called a parliament, to meet him at Oxford anno 1204.[f] In the year 1224 Henry III. met the archbishops, bishops, earls, barons, *and many others*, at Northampton;[g] and in 1232 he met the nobles, as well prelates as laics, at Westminster[h] in 1233; at Oxford and at Westminster the *barons* only are named.[i] In 1234, at Westminster, *bishops* and *barons*.[k] In 1236, at Merton, *bishops* and *peers*.[l] In

* *Eodem anno* 1107, *factus est conventus* episcoporum *et* abbatum, *pariter et* magnatum *Londoniis in palatio regis*.——M. Paris.

Conventus omnium episcoparum, abbatum, *et* procerem.—Sim. Dunelm. *anno* 1107.

1116. *Conventio* optimatum *et* baronum *totius Angliæ*.—Sim. Dunelm.

[d] M. Paris. [e] Chron. Brompt. [f] M. Paris. [g] Ibid.
[h] M. Paris. [i] Ibid. [k] Parl. Hist. v. i. p. 31. [l] Annal. Burton. p. 287.

1237, *archbishops, bishops, abbots, installed priors, earls,* and *barons.*[m] Another at Westminster in the same year, consisting only of the *peers.*[n] In the year 1242, consisting of the whole nobility of England, as well prelates as earls and barons.[o] From these, and many other records that might be quoted, it appears that nothing was determined as to the precise form of parliament, or its constituent members; but that in general the notion prevailed that the king ought, in difficult cases, to consult the *great men* of his kingdom, whom he might summon at what time, and in what manner he pleased.

The people had at length, however, perceived that inconveniencies had arisen from this discretionary power in the crown, and wished to correct them.

During the long and weak reign of Henry III. and the more warlike princes that succeeded him, the great object wanted from parliament, was money.—The kings were in want of money, nor had they yet acquired, in this country, so much authority as to be able to extort it by force. The prevailing idea of the times was, that nothing except personal services of the tenants of the crown, *in capite,* and the great feudal incidents, could be demanded by the king as a due; and that all other levies of money must be voluntarily accorded by the individuals who were to pay it. Upon that principle, we find that in 1255, the nobles refuse to grant an aid under the pretext that "the whole of the peers had not been summoned to parliament,"[p] and upon the same principle we observe, that for many years afterwards, the clergy, the nobility, and the other

[m] M. Paris. [n] Parl. Hist. p. 36. [o] M. Paris. [p] Parl. Hist. v. i. p. 57.

orders of the state, granted each a different degree of supply, as suited their humour at the time. Thus, anno 1295, the laity gave an 11th, the clergy a 10th, and the merchants a 7th.[q] Again, anno 1306, the prelates, earls, barons, and other great men, and also knights of the shires, grant an aid of a 30th:[r] the citizens, burgeſses, and others of the king's demesnes, grant a 20th part of their moveables, and so on; in almost every grant in those days the rate is different on each order of the people.

It is not a little curious to trace the gradual progreſs of ideas, and to mark the influence that these had on the conduct of government. While the notions above cited prevailed, it was sometimes difficult to get one part of the parliament to comply, while another part of that aſsembly was disposed to agree with the wishes of the crown, and no doubt this gave rise to much disquietude and various intrigues, which have now for ever eluded our notice. Some of the arts that were adopted to induce compliance are, however, still upon record. Thus we find, that in the year 1301, the nobles were detained in parliament after the knights and burgeſses were suffered to depart.[s] In the year 1372 the knights of shires are discharged; but the burgeſses detained, "in order to induce them to give a farther subsidy."[t] This stretch of power would soon be considered as a grievance, and call for a remedy.

It is obvious that during all this period the general notion prevailed, that no aſseſsments could be laid on any body of men in the kingdom, but in as far as they had individually aſsented to it. The prelates,

[q] Parl. Hist. v. i. p. 98. [r] Ib. p. 138. [s] Ib. p. 118. [t] Ib. p. 313.

earls, barons, and others, each granted individually from themselves that which they judged proper, and no more. They were all summoned, and sat in council, not as delegates, but as integral parts of the kingdom: none of their resolves in regard to this important particular, were considered as binding upon any individual even of their own order, unleſs that individual himself had aſsented to it, as may be plainly inferred from the refusal of the peers, anno 1235, to grant a supply, *because the whole of the peers had not been summoned to parliament*, and that of course those only who had been summoned would be liable to pay the aſseſsment.

It was probably with a view to get a tallage of the cities in a more pleasing way to them than that which had been heretofore practised, and to answer other purposes at the same time, that Simon de Montfort first summoned *burgesses* to parliament, anno 1264; an innovation in the constitution that does not seem to have been a measure of great popularity at the time, though it would be tolerated by the other constituent members of parliament, as it would then be understood the burgeſses met there for no other purpose than to vote from themselves what sums they were willing to pay to government on extraordinary occasions; and, though the sending burgeſses to parliament would be deemed burdensome to the cities, yet it was so much preferable to the modes that had been formerly adopted for forcing money from them, that the inhabitants would submit to it as a leſser evil.

That it would prove, in this way, agreeable to the cities and boroughs, we may conjecture from the fol-

lowing fact narrated by Brady: he observes that, anno 1294,[u] the king caused a tallage to be aſseſsed without common consent, by commiſsioners, on all cities, burghs, and demesnes in every county of England, either individually [*capitatim*] or in common, and gave particular direction, that the tallage of Norwich should be aſseſsed at 400l. Before that time he remarks, "the cities used to compound with the kings officers or justices, and make what bargain they could." No wonder, therefore, that they should be well pleased at an alteration that promised to give them a vote in the disposal of their own money.

The real state of the cities at that time, in regard to aſseſsments, will be made still more clear by the following particular, specified by the same author. "Anno 1294 (23 Ed. I) the clergy grant a moiety of their benefices; the earls, barons, knights, *et omnes alii de regno nostro*; that is, the tenants *in capite* grant a tenth; for that the cities and boroughs were not included under the general denomination of *omnes alii de regno nostro*, he justly observes, appears by the following deed still preserved on record: *Rex dilecto et fideli suo Roberto de Retford, salutem, cum cives et probi homines London, &c.* that is, "The king to "his well beloved and faithful Robert de Redford, "greeting. Whereas, our good citizens, and good "men of London, have willingly granted to us, to- "wards maintaining the war, a sixth part of their "moveable goods, that they might show an ensample "to other of our demesne towns to make the like, we "have aſsigned you to demand a like sixth part on

[u] Brady, p. 35.

"every of our demesne cities and other towns in the "counties of Kent, Surrey, Sussex, and Southampton, "according to the taxation of a tenth now granted to "us in our kingdom; and therefore we commend you, "that taking the sheriffs of places, ye personally go "to every of our cities and demesne towns, and dili- "gently inquire, and *effectually induce* the men of "the said cities and towns, *by such means as you think* "*expedient*, to give and grant to us the said sixth "part, according to the taxation aforesaid; and what "you do herein you shall signify to us, or our trea- "surer, and barons of exchequer without delay. In "witness of which, &c. the 21st November, the 23d "year of our reign."[x]

What a wretched state must a people have been in who were liable to such arbitrary exactions? No wonder that they should adopt any alteration in regard to this particular with pleasure. This evil was, like many others, gradually corrected, as we shall soon see; but does it not argue an extreme perversion of judgment, for men with such facts before their eyes, to insist upon, and argue for the propriety of reforming our constitution, *by bringing it back to its former state?* We shall soon see other as powerful reasons for wishing to avoid this conduct.

I shall only here advert to the necessity of guarding against being misled by terms that accidentally have been employed in ancient deeds. Those who contend that the phrase *omnes alii de regno nostro* clearly and decisively included every inhabitant of this kingdom, except the clergy, earls, barons, and knights, who had

[x] Brady, Bur. p. 31.

been formerly specially enumerated, as the phrase might well import, would reason, as appears by this authentic document, in a very improper manner; therefore this source of error should be carefully guarded against.

[*To be continued.*]

ON THE BENEFITS THAT WILL RESULT FROM THE ABOLITION OF THE SALT DUTIES.

To the Editor of Recreations in Agriculture, &c.

SIR, London, May 18, 1801.

I HOPE I shall not be thought guilty of transgreſsing the law you have been pleased to establish, which forbids party politics from a place in your miscellany, when I congratulate the public in general, and you, sir, in particular, upon the motion made by the Chancellor of the Exchequer very lately, for abolishing the salt duties, which, I am well aſsured, from the general tenor of your writings, you will agree with me in thinking is one of the most beneficial measures of police that has been adopted in this country for many years past. It is no part of my design to panegyrise the present *premier*, or any minister; nor do I conceive that you will think me guilty of that crime when I say, that if this motion be followed up by others of an equally beneficial tendency, the public will have good reason to be satisfied with the conduct of those who shall be active in bringing them forward.

The chief intention of this letter is to request that you will not suffer the present opportunity to paſs

without calling the attention of your readers (who, if I am rightly informed, form a considerable proportion of the *thinking* part of the community) to this subject, by pointing out a part at least of the innumerable advantages that the community must derive from this measure, should it fortunately be carried into effect, on the broad base of perfect freedom in regard to the manufacture, sale, and use of this great article of universal utility, of which mankind may be said to have been denied the use by injudicious laws in every nation on the globe, by reason of which the benefits that might have been derived from it have been circumscribed within much narrower bounds than it ought to have been, so that its qualities have only been very partially ascertained, and its real value, of course, in a great measure unknown. I am well satisfied that a few hints from you on this subject might have a very good effect on the public mind upon the present occasion.

You will easily be satisfied from what I have already said, that I have perused what you have stated in your account of the Hebrides respecting the influence of the salt laws on the British fisheries; and as it has been my fate, from a peculiarity of circumstances that it would be of little consequence to the public to be informed of, to have an opportunity of watching the progress of these fisheries for some time past, I think it a duty in me to state that, from the most careful attention to every particular affecting these fisheries, my mind was never more feelingly impressed with the conviction of any one truth than of that which you have in that treatise so clearly stated, viz.

that it is to the operation of the salt laws, and these alone, that we must ascribe the inefficacy of every plan that has yet been devised for promoting those fisheries, although the sums of money that have been uselefsly expended for that purpose have been so great as to exceed belief; the items being so numerous as to baffle all attempts at computation: nor do I believe it is *possible*, while these laws shall continue in force, by the expenditure of premiums or bounties to any afsignable amount, ever to put these fisheries into such a state as that they can be of great national importance. It is from this conviction, when conjoined with the obvious facility of extending these fisheries far beyond the utmost limits that could at present be deemed probable, could these laws be abolished, that I take so much pleasure in viewing the proposal which gave rise to these remarks.

When I observed lately that the Society of Arts in the Strand, whose views have been so often directed to objects of great national utility, had included the British fisheries in the list of their premiums, I felt an inclination to state to that respectable body of men some observations on that subject: but the consciousnefs of my inability to lay open in a satisfactory manner the numerous bars which that long established system of iniquitous oppreſsion had thrown in the way of industrious exertions; and the little probability that these would be attended to by those claſses of men who only have it in their power to cherish the industrious poor, I was deterred from the attempt. This consideration had still the greater influence on me, when I did not perceive that your labours in the same

line, which I had every reason to be satisfied had been more read and respected than any thing I could write ever would be, had not produced any sensible effect: but now that I see men in the most respectable station acting upon the same principles, my hopes are revived; and I apply for your afsistance, with a view to avail myself of every circumstance that can tend to support that measure.

Should the poor but industrious inhabitants of the coasts and islands of Britain be ever permitted to buy and use salt without the smallest limitation or legal restraint, they will soon be able to fish in small boats at every convenient season, and to cure, for their own use at least, fish of various sorts at almost every season of the year. Whatever they can catch beyond that quantity they will be able to exchange with their neighbours within land for such neceſsaries as the one party can spare and the other stands in need of. This will be the case respecting even the first imperfect attempts, before they shall be able to cure them in a proper manner for foreign markets. Out of the profits they will derive from these rude beginnings, a few of the neighbouring persons will, by joining their little capitals and credit, buy boats, and lines, and nets, which will extend the limits of their incursions in proportion as their skill in the different departments of the art augments. In proportion to the skill and industry exerted, the market will become more extended; and *if the profits remain with those whose industry is exercised*, that will give additional spirit to all their enterprises, which, by being continually exerted, will soon enable them to discover new sources of emolument,

which will prove sources of augmenting industry. Thus will a numerous people, who are at present doomed to a habit of idleneſs and depreſsion of mind, be quickly roused into energy. Their ability to produce materials for trade *at a low price* will quickly attract merchants to profit by their industry, who will carry off their superfluities, and bring back, *for profit*, whatever is wanting in the country; and that country which exhibits at present the appearance of a melancholy desart, will soon become a theatre for manly industry and sportive joy.

I need not, sir, state to *you*, who have examined this subject, the way in which the seemingly trifling circumstance of granting a freedom to the trade in salt should produce an effect of the nature above pointed at; but I am aware that to many of your readers it will seem that I ascribe too great an effect to so trifling a cause; those especially who know that salt that is employed upon the curing of fish has been at all times allowed by the law to be *duty free*, will think that *fishermen* would be nearly in the same state at present as they will be after the duties on salt shall be removed. But to poor men this difference is infinite. By *them* no salt can at present be bought; because not an ounce of it can be bought without going to a custom-house, and there granting a bond for the amount of treble the value of the salt, that it shall be wholly employed in the curing of fish of certain descriptions; and before that bond can be recovered, either the salt itself must be brought back to the custom-house, or the fish that have been cured with that salt; and considerable expences be incurred by these bonds. From this state-

ment, it is clear that no poor man can ever obtain any of that salt; for he cannot be at the expence of travelling himself to the custom-house (perhaps a hundred miles from his native home) to buy it; nor could he send his fish thither after they are cured; nor could the small quantity he could buy afford to bear the expence of the bonds. To him, therefore, it is the same thing as if no salt existed. He is totally deprived of the power of obtaining any of it to employ for his own use. He might be even starved for want at one season of the year, although at another season he had more fish within his power than might have fed him and his family for years together. For want of salt to cure them they must be wasted. This in fact does happen almost every year. In consequence of the deficiency in this indispensable article, the poor people there have been reduced to various shifts to preserve a miserable existence; and, among others, it is by no means an uncommon thing for them to attempt to dry herrings *without salt*, by hanging them upon rods, like red herrings, to dry within houses whose walls are made of a sort of watling, or wicker work, which, in the most favourable season, are a nauseous food; but when the weather is still or damp, it forms a morsel that a dog which had not been accustomed to such food scarcely would taste. If the proposed law should pass, all this will be done away; any man will be able to buy, perhaps, a single ounce of salt nearly at his door. This will enable him to cure his fish as they are catched, and to store them up for his own use, or to sell them to a neighbour, or to any person who chooses to have them, with freedom, at such price as

they will bring: nor will it be incumbent on him to catch only certain descriptions of fish, or to cure them after a particular manner only; he may catch any kind he pleases, and cure them in the way that he finds will best suit the market within his reach. Thus may he continue his exertions at all seasons, with a perfect assurance that he will be entitled to receive a fair market price for all that he can produce for sale.

I might enlarge upon this subject of the fisheries and the situation of the poor people, which have been my particular study for many years past. I might state the number of persons, who are now rather a burden upon society than beneficial to it, to whom it would afford a comfortable subsistence—I might show in what manner it would train up a numerous breed of hardy seamen, who would at all times be at hand to man our navies, and thus to form an impregnable bulwark around our isle, and free us for ever from the dread of any foreign invasions—I might develope the manner in which a never-failing store of wholesome provisions could thus be at all times obtained at a very moderate price, so as effectually to guard against every prospect of famine under any possible state of things—I might even demonstrate that it would prove one of the most copious sources of national wealth and public revenue; but in doing these things, I could do little more than go over the same ground that you have already occupied, and perhaps tire your readers. I therefore desist, and only request that you will add to these imperfect hints a slight statement of some of the other benefits that would result from a repeal of the salt duties; for I confess that I am much less at home

on any other department than that of the fisheries. In doing this you will oblige a constant reader,

PISCATOR.

I wish it were in my power to add any thing that could prove satisfactory on the subject of the foregoing letter, for doubtleſs there are few subjects that I deem of greater importance; and I rejoice exceedingly to think that a motion to repeal the salt duties has proceeded from the source from whence that has come. It is what I have long wished for; though I scarcely hoped to see it effected. The following fact I think of too much importance, on the subject of the present inquiry, to be suffered to paſs by unnoticed on this occasion. I have communicated it in a private manner to some persons who I conceived might have influence in the national councils; it ought to be publicly known.

About two years ago, a gentleman of great respectability from the island of Nantuchet in North America informed me, that from the representation he had met with of the state of the fisheries on the coast of Scotland in the account of the Hebrides, he had been induced, along with some of his friends, to send a fishing veſsel to that station for three succeſsive years together, with a view to satisfy themselves respecting the fisheries there: that the result was such, as that he was authorised to state to me, that if the British government should ever think of taking off the duties on salt, and allowing a free trade in salt and British cured fish in this island and elsewhere, that he and others, without any bounties or other encouragement, would

come and fix themselves in some convenient station for the sole purpose of carrying on the fisheries as a business, with a capital of at least *one hundred thousand pounds*. I state this fact simply, as it speaks a language much stronger than any thing else I could say, and ought to have a more powerful effect upon the minds of those who attend to the question under discussion than any speculative reasoning ought ever to produce.

I shall use the freedom, however, in compliance with my correspondent's request, and other considerations, to hint at a few other benefits that will probably result from the abolition of the salt duties, should that measure be carried into effect. It is will known, that several years ago a manufacture was begun in this island for making an alkaline salt of the nature of barilla from common salt, in which Mr. Keir of Birmingham had a concern. They produced a much purer alkaline salt than Spanish barilla affords, which was better adapted for many manufactures than barilla, and could be afforded at a lower price. But although an act of parliament was obtained for exempting the salt employed in this manufacture from the duty, as is done for curing fish under certain circumstances; yet I was assured, upon the best authority, that on account of the restraints which that exemption subjected them to, and on that account alone, they were forced to give up business. By the regulation proposed, this restraint will be now taken off; in consequence of which we may not only obtain salt within ourselves for our own use for the purposes of making soap and glass, and many other articles of manufacture, but may

be enabled to supply other countries with alkali at a much lower price than Spanish Barilla, so as to bring this to become an article of foreign export to an indefinite extent and incalculable value.

In consequence of the freedom in the trade of salt, Britain may soon be able to afford common salt at a much lower price than it can be had elsewhere; for were permiſsion granted to carry rock salt from Nampt-wich in Cheshire wherever it might be wanted, it could easily be conveyed by the canals at a small expence to any part of the island; so that wherever coals are to be employed in great quantities for other purposes, as at iron-works, glaſs-houses, lime-works, and others, salt might, by a very simple proceſs, be purefied and granulated without the expenditure of one particle of fuel; and at coal works every where the refuse coal might be thus applied, which in many places is now suffered to go to absolute waste. By these means the price of salt might be so far reduced as to make it an article of export to such an extent as to diminish the home freight of veſsels, and be a source of much wealth to the nation.

In consequence of the reduction in the price of common salt that would be thus induced, it is impoſsible to say how much it might tend to lower the price of many manufactures, and thus to extend their sale. The leather manufacture in particular would be prodigiously beneſitted, and many others that I only am in part acquainted with, or know not at all. The iron manufactory, which is at this moment of great extent, and still extending, so as to promise to be in a short time perhaps decidedly our first staple manufacture,

would be benefitted by it in a way that I did not till very lately know. One of the greatest manufacturers of iron in Britain assured me, that from experiments he has made, he has undeniably proved, that were he at liberty to use common salt without restraint at prime cost without duty, he could produce iron of a *quality* much superior to any iron that has as yet been brought to market, and at a very moderate price.

If to these particulars you add the benefits that would be derived to agriculture from the liberal use of salt in the feeding of cattle and otherwise, the value of which might perhaps amount to many millions a year, there will remain little doubt that this measure may be justly accounted one of the greatest improvements in political legislation that has been adopted in any age.

The following extract of a letter from Dr. Berry, of Madras, containing some farther particulars respecting Chunam, in addition to those of Dr. Anderson, (See Vol. I. M. p. 1.) the Editor doubts not will prove acceptable to the readers of this Miscellany.

To the Editor of Recreations in Agriculture, &c.

MY DEAR SIR,

WHAT you observe on the chunam process, of course, attracted my notice; and as you theorise on the nature of the calcareous matter, I have enclosed two of the fossile shells, of what almost all our chunam is made, at least all that is used for fire or strong work; they will, I think, belong to the genus *anomia*, and are found in strata of one and a half or

two feet to the southward of this [Madras] about twenty miles, at the depth of eight or ten feet, and brought here in very great quantities. The only other used is improperly called stone chunam, being very impure small nodules, like stones, of calcareous matter mixed with earthy impurities, collected and separated by the rains washing away the clay. The strength of our mortar, no doubt, principally depends on the addition of coarse sugar; for if that is left out, the plaister has little or no cohesion; nor does it harden so soon. In the fine chunam, however, there is no sugar. The want of it is made up by the other ingredients mentioned by Dr. Anderson, and being laid on the walls very thin and rubbed constantly when drying to afsist the expulsion of the watery particles and increase its union with the plaister underneath, it can only be considered a beautiful brittle polished covering. If the water used has been pure, and the alkaline ashes of the charcoal used in calcining the shells previously washed been carefully separated, the fine chunam is hard and durable, but the least exudation or efflorescence of marine salts or calcareous nitre detaches it entirely. From its closenefs, it should probably not be applied till the mortar of the walls returns to its mild state, and no longer absorbs air from the atmosphere. I think I once sent you some coloured pieces from Golionda of fine chunam.

I meant to have given you some idea of the soil here, and the probability of its being alluvial, so far favouring the idea and belief that the sea once washed the foot of the Gauts, or interior range of mountains, separating the high from the low country. This is,

however, too much; but that a great part of the coast has been a continuation of lakes, many now filled up, I believe, and that a great part of the bounds of Madras has been gained in this way. I will give you my reasons for thinking so in another letter, as I find I have not time now, the packet being just closing.

Your son William is not yet returned from his voyage to Botany Bay. With Dr. Anderson's best compliments, and my own, believe me yours very sincerely,

ANDREW BERRY.

Reading Memorandums.

"DREAMS (says Hobbs) are the reverse of our waking imagination; the motion when we are awake beginning at one end, and when we dream at the other."

"Among the materials of which humanity is composed, consistency is the least powerful ingredient."

"The magnificence of his wishes acted in constant warfare against the mediocrity of his worldly poſſeſsions."

"Oppreſsed as I am with my own afflictions, my heart is yet alive to sensations of joy in the welfare and happineſs of my friends."

"The spirit, nursed in ease and tranquillity, and unsuspiciously reposing in the lap of long continued prosperity, its vigour untried, and its strength uneſsayed, receives at once the inevitable blow, and, incapable of bending to the storm, breaks at the first aſsault of misfortune."

"Why should we continue a separation which cuts

us off from the perfect enjoyment of the greatest blefs-ings of mortality, the unrestrained indulgence of pure and mutual friendship?"

"Remember, that while I am blaming you for a single fault, or rather failing, I admire you for a thousand virtues."

"What more can be said now, when forests are robbed of their music for the sake of the rumps of nightingales."

"The youth of society is commonly like that of man, lost in tempestuous paſsions, which call forth extraordinary exertions of the mind. Such exertions form the very soul of poetry."

"Indifference for fame is by no means to be regarded as a virtue. If the desire of praise be a vice, it is a vice that is the parent of many virtues."

"Prithee" (as Falstaff says to Pistol) "speak like a man of this world."

"How much sweeter are the soft whispers of gratitude, than the loudest plaudits of popular praise."

"When Lolio feasteth in his revelling fit,
Some half-starv'd pullet scours the rusted spit."

"The great examples to be found in ancient history operate like electrical fire when they meet with congenial minds. The greatest modern statesmen have caught the flame of their inspiration from the altars which ancient Greece erected to honour and to virtue."

"No amusement deserves scorn that is an innocent relaxation from anxious thoughts and the cares of life."

Acknowledgments to Correspondents necessarily deferred on account of the absence of the Editor.

28.

JUNE 1801.

RECREATIONS, &c.

N° 4. Second Series, Vol. I.

Observations on the most proper measures to be pursued for obtaining the best kinds of potatoes, for extending the uses of that valuable esculent, and for improving its culture.

[*Continued from page* 175, *and concluded.*]

Mode of culture, with a view to ascertain the maximum produce and other qualities of different kinds of potatoes, on a fair comparative trial.

A SPOT of clean rich land, as uniform in its quality as posſible, should be made choice of for the experiment, at some distance from London. If posſible, the place should be concealed from the knowledge of the public, with a view to prevent impertinent visitors. At any rate, it should be well fenced in, the gate locked, no stranger allowed to enter into it during the course of the experiment without a written order from particular persons; and to insure against accidental trespaſses, a guard should be made to watch every night from the time the potatoes appear above ground till they be taken up. Somewhere in the *hundreds* of Eſsex, at no great distance from the river,

appears to me to be, upon the whole, the best place to look for such a field.

If the ground is in graſs, which, if rich enough, I would by all means advise should be the case, it should be ploughed up in the month of August, by as shallow a furrow as the state of the ground would admit of at the time; the sward being turned on its back as flat as may be, with a view to its rotting quickly. In the month of October it should get a very *deep* clear furrow, laying it then into ridges with clear water-furrows, that should be so deep, if the sub-soil be retentive, as to carry off all the water, not from the surface only, but from the very *bottom* of the soil that has been stirred by the plough. It is of much consequence that the soil should be loosened at this time to a good depth; for it is thus alone that the *surface* mould can be kept so dry during a continuance of rainy weather as never to become a pap; which it infallibly will be if the rain be forced to seek a paſsage to the furrows along the firm mould immediately below a very few inches only of mellow soil that has been touched by the plough. An inattention to this circumstance loses many a crop of potatoes, and other crops, upon *retentive* soils. I need hardly add, that the ploughing should be given while the ground is in a proper state of dryneſs. Wet ploughing is always prejudicial to a potatoe-crop, and therefore ought to be guarded against.

In this state the land ought to lie all winter. In the month of March, as soon as the ground is so dry as to admit of working kindly (and it ought on no account to be touched but when it is in this state, if

it should be allowed to remain even till the end of April, which can scarcely ever happen in our climate) it ought to be ploughed acrofs. This operation should, if it can be got done, be performed by means of a turn-wrest plough,* in order to avoid the crofs furrows that will be left if done by a common plough, which would be in some danger of marring the accuracy of the experiment. And now is the time for the experimenter to exert himself with the most unceasing alacrity; for should he allow himself to be surprised by a heavy fall of rain during the time that the crofs-ploughing is going forward, he runs a great risk of losing his crop, or at least of diminishing it to such a degree, as totally to frustrate the intention of the experiment. He must therefore be extremely cautious how he begins this operation, if the weather appears to be precarious. If the weather be indeed unsettled, it will be better to forego the benefits to be derived by a crofs-ploughing, and rather content himself with ploughing it in ridges; by which the danger from *rain* will be thus diminished, though in his experiment it will subject him to a crowd of leſser evils that he ought, if poſsible, to avoid. At any rate, when he is to begin his crofs-ploughing,

* The Kentish turn-wrest plough is a clumsy awkward implement, which is both weighty and weak, and does its work poorly. But there is a plough of this kind invented by a Mr. Small, near Edinburgh, in which he uses two coulters; one of which is alternately put up as occasion requires, and shifts the muzzle, coulter, and mould board all by one motion at turning, so as to make the plough at all times perform its work as well as a fixed plough, while it is at the same time very strong, and so light as may be drawn by the smallest horse, if required. This is the kind of plough I recommend for horse-hoeing; and, if made large enough, would answer well in this place.

he ought to bring all the strength forward he can; to feed his horses double, and make his servants perform as much work as posſible. In short, he himself must be constantly on the spot, to see that not a moment be lost in pushing the work forward, so as to get it put out of danger as quickly as posſible: and, besides all this, he must be continually upon the watch, so as to be ready, if *rain*, in spite of all his precautions, should surprise him, to have the water-furrows drawn through it at any rate, before it can be drenched with moisture. Those farmers who are in the custom of going to their beds, for weeks together, and sleeping with tranquillity while their ground is in this precarious situation, will wonder at the anxiety I expreſs on this head; but their climate must be better, or their rents lower than in Scotland, or this could not be done.

The moment the croſs-ploughing is completed, the field should be laid out, in the direction of the ridges, into breadths of three feet each over its whole surface; and furrows drawn along each by means of a plough having a double mould board, with a very flat sole, so as to mark a wide flat furrow, in which the potatoes are to be deposited. This furrow should only be from two to three inches deep, as was formerly said. The plough for this purpose should be drawn by two horses yoked abreast; not that such a force is required to draw it, but in order that the horses may tread on each side of the line in which the potatoes are to be deposited, and thus not mar the result of the experiment.

While this operation is going forward, every thing

should be got in readineſs for planting, that no stop may be made in that operation. The sets must all have been previously *weighed* (each set *individually*) and reduced to the precise weight of *two ounces* each. If there are many plants, this will be a tedious proceſs; and, as the accuracy of the experiment depends upon this operation being performed with the most cautious fidelity, this part of the operation should be entrusted to two persons, whose fidelity, care, and patience, can be depended upon: and, to insure against the danger of mixing, this operation should be done in a place where no potatoes are kept. Each kind should be brought separately into this place; and, when they are all weighed, put up again, and carried away; the place should be cleared, and all the chips sweeped out before another kind be brought; and so on till the whole shall be completed: a line should also be provided, that should be divided into regular lengths of twelve inches each, by means of knots made upon it all along. No sooner should the furrows above mentioned be drawn, than this line should be stretched along the middle of one of these furrows, so as to be quite straight from end to end. The sets are then to be deposited by the side of that line (one at each knot) beginning at one side of the field, and proceeding regularly forward to the other; always planting out the whole of the sets of one kind before the bag containing another kind be opened; the *exact* number of sets of each kind having been previously ascertained by an enumeration thrice done by different persons.

To guard farther against inaccuracies, the first five or six rows next the edge of the field should be planted

with potatoes that are no part of the experiment: and the field should be of such a length as to contain the whole of the sets of one kind either in one, two, three, or more rows, so as to keep them from being mixed in the same row. But in whatever way they are planted, five or six yards on each end of every row ought to be planted with potatoes *not* of the experiment, because there is no certainty of guarding these from accidents by the horses in turning, or otherwise. These common kinds of potatoes should be separated from those of the experiment by an interval of a couple of yards; which may be planted with beans, to serve as an indelible mark of separation. In this manner one kind may be made to succeed another, till the whole be finished.

No sooner shall the potatoes be planted, than another set of operators should follow, to cover the sets with rank stable-dung, provided for that purpose. This should be laid lightly over each set, and so as to fill the whole of the trench to the height of three inches, or more, if the quantity can be got; and without loſs of time, a *deep* furrow, made by a double mould boarded plough, drawn by two stout horses, should be drawn along the middle between each row, so as to cover the dung in part on each side, leaving a clear furrow between the rows for carrying off the water. When all this is done, the field is out of danger for that season; and come what weather will, the crop will be abundant, if all these operations have been performed while the ground is in good tilth. It is *now* the labourers should get a liberal entertainment; the certainty of which will animate each in his previous labours: and

now also the superintendant may take a sound sleep, without fear of being taken tardy. I am abundantly sensible of the tiresomeneſs of attending to these practical minutiæ; but, unleſs they are to be attended to with the most scrupulous accuracy, experimental agriculture is a mere farce, and it ought never to be attempted. In the present case, an inaccuracy in some of these trifling circumstances may make a variation in the produce not of a few pounds only, but of some hundreds of pounds in the result; in consequence of which the Board would not only do injuſtice to the competitors, but would lead the whole nation into a very great error. It was in some measure to guard against the proportional effect of a casual error, which no caution can absolutely insure against, that I recommended the number of 1000 sets as the *minimum* for this experiment. There is still one other precaution that ought not to be omitted: it is not impoſsible but some of the competitors may contrive to slip in a few other sorts among their sets, in spite of every endeavour to guard against it: and in that case the best means of discovering the fraud is to examine the plants while growing, as the habit of the two kinds may be distinguished, where the bulbs could not. If these appear, they should be marked, and carefully compared with the others when lifted; and, wherever such mixture is found, that parcel should be debarred from obtaining the premium. In another sense is attention here required: when the potatoes are taking up, a person should always attend to observe with great care wherever a plant that is uncommonly prolific appears; for, in whatever way it has been produced, it ought

not to be lost. These individual prolific plants should be compared with each other, both as to weight and taste; and if one is found greatly to exceed the others in these respects, it ought to be set apart for further trials. Nor needs this be a very tedious proceſs. I should not be at all surprised to find the produce of one of these extra stems to be 20 or 25lbs: and if these should be propagated with care (as described below) it would be no marvellous produce to reap from 12 to 1400lb. the first crop.

The most troublesome part of these operations, and what requires a nicety, accompanied by an expence that cannot be avoided in this case, is the bringing the dung upon the ground, and distributing it equally over the whole field. At the distance of twenty or one-and-twenty rows, a space equal to three rows at least must be appropriated for a road; the carts to come in at one end of the field, and to go off at the other end; the dung being deposited at the proper places where wanted in that road. As soon as it is laid down, it must be put into shallow baskets by aſsistants, and carried to the furrows, where it is to be finally deposited; but in croſsing the rows, care must be taken that the carriers step clear acroſs the rows, so as not to trample on the furrow where the potatoes are deposited. After the whole has been thus dunged, the place where the road has been made must be ploughed up, laid out into rows afresh, and planted with potatoes that do not enter into the experiment. No matter whether they be dunged or not.

After the field has thus been regularly laid up into ridges of three feet each, it ought to be horse-hoed at

the interval of a fortnight, or thereabout, between each time, if the weather permits, till the potatoe-stems are so far advanced as no longer to admit of it. This horse-hoeing should be performed in the following manner:

Suppose you to be posseſsed of one of the ploughs having a mould board that shifts (the operation *can* be performed with an unvarying plough, with certain precautions that need not here be specified) see Vol. II. p. 333; begin at one side of the field, and in the furrow that is in the middle, between the *first* and the *second* rows, let a horse go so as to allow the plough he draws to take some earth from the side next the *first* row, and lay it towards the *second*, then turn; and, having shifted the plough, return in the furrow that has just been made; and taking a narrow furrow, and pretty deep, lay as much more earth still from the *first* row towards the *second* as you can with safety, so as to come as near to the first row as can be done without disturbing the plants; then go up the furrow between the second and third rows in the same manner, turning the earth from the second towards the third row, repeating the same operations to each over the whole field, till you come to the opposite side, in which state the furrows will all be brought quite close to the rows *upon one side*, and the earth will be laid towards them *on the other*. The next hoeing is to be performed by directly reversing this operation, so that the earth will now be turned towards that side of the rows where the furrows were before, and the furrows will all come to be laid open on the *other* side of the rows; but the operation must be so conducted as that the earth shall

always be laid towards the one side of the row before the furrow be opened upon the other side of it. In this way the place in which the plants grow, being always supported by the weight of the earth that lies at the opposite side to where the plough is cutting, gives such a resistance as to keep it firm, and to allow the plough to come as close to the plants as shall be deemed proper, without danger of disturbing them; and as there is always a body of fresh moist earth (at *one* side at least of the row of plants) into which the roots are at liberty to strike with ease, the plants are never in danger of being withered by drought, as when the earth is drawn from both sides of them at once, in the ordinary way of horse-hoeing. I have practised this mode of horse-hoeing for many years past on cabbages, turnips, and potatoes, and can safely say it is one of the greatest improvements I have seen in the practical department of agriculture: and it is so much easier to perform, and so much more pleasing in every part of the operation, that no one who has once experienced it will ever think of adopting the common practice in this respect.

Weeds in the rows must be effectually extirpated wherever they appear; and at every horse-hoeing the earth must be raised a little higher upon the plants than before, till at last, when, if the dung should not be entirely covered by the plough, a person with a shovel ought to close up lightly any imperfections.

The plants will then advance with so much vigour, that unleſs it be those kinds that have weak or sticky unbranching stems, they will effectually keep down all weeds, and will require no farther attention till the

time they are to be lifted. But if any weeds should appear, they must be carefully extirpated by a very sharp hoe, or hand-weeding, as soon as they are fit to bear these operations.

When the potatoes are ripe, a dry time should be chosen for lifting them. They should be lifted (each kind by itself) by means of a spade, which is a very convenient tool for this purpose; two young persons being employed to gather for every spadesman. The produce should be immediately carried home, each kind by itself, and weighed and deposited in some place where it is in no danger of being intermixed with any other kind.

In this manner the proportional produce, and the time of ripening each kind, will be accurately ascertained. There will be more difficulty in ascertaining their relative value in respect to taste. This can be ascertained only in consequence of repeated comparative trials by different persons, who know nothing of the kinds; and that kind ought to be preferred which, on an average of trials, shall be found to obtain the greatest number of votes.

When the best kind shall be thus selected, it should be distinguished by a particular name, and the premium awarded to the person who shall have been found to be entitled to it (no premium to be given unleſs the produce shall exceed the rate of thirty tons per acre): and if the Board should think proper to aſsign smaller premiums to the second best, the third, and so on, let each of these also be ascertained, and named in like manner: after which a faithful account of the kinds and quantity of produce of each should

be published in the newspapers, for the information of the public, and the produce of the different kinds advertised for sale; the best kind, at the rate of one shilling a pound, to be made up into parcels of five, ten, fifteen, twenty, and twenty-five pounds each. No quantity exceeding twenty-five pounds to be given to any single person, nor any of them to be distributed in presents. By this means, curious persons in every part of the country would have an opportunity of obtaining the true sort: and as to the price, I know from experience, that the only way of making any thing be attended to and preserved, is to sell it at a good price; so that by this means the breed will be carefully preserved till it be sufficiently increased to become universal: whereas, if it were given away in presents, or at a small price, people would be careleſs about it, and there would be a chance that it might be lost in a very short time, or monopolized by a very few hands.

The other kinds might be in the same manner advertised, and sold at such inferior prices as should be deemed best.

Along with each parcel, printed directions should be sent, for increasing these kinds as quickly as poſsible; because, where a great increase from a small weight of sets is the chief object aimed at, a very different mode of management is required from that which must be followed where the greatest quantity of produce from a given extent of ground is the object.

From my experiments, it was as clearly proved that the greatest produce from the same *weight of potatoes* was obtained from the *smallest* sets, as that the great-

est produce from the same *extent of ground* was obtained from the *largest* sets. The increase of *weight* from *large* sets was from *three* to *four* times that of the seed planted; whereas from *small* sets it ran from *thirty* to *forty*. Hence it will follow, that those who get these new kinds of potatoes, ought to be directed to cut them into as many pieces as there are prolific eyes (always excluding the hollow where the umbilical fibre was attached to the potatoe) leaving *one* eye only in each set; taking care to cut up the potatoe in such a way as to make each of the sets to contain as nearly as posſible the same quantity of matter; which, with a little care, can be easily done. The plants being thus divided, should be planted in rich well prepared ground, well dunged, in rows three feet apart, and at eighteen inches from each other in the rows; the ground to be carefully hoed, and well managed in every respect; under which management there is little reason to fear but that the quantity would be augmented fiftyfold during the first year; so that an abundant supply could soon be thus obtained to stock the whole country; and while this proceſs was going forward, the superior price that would be obtained for the sets, would make up for any deficiency that might be incurred as to the quantum of crop from the same extent of ground.

It is by no means impoſsible but that, by one premium thus applied, the thing wanted might be obtained; but as there would be still a chance for new improvements, the same premium might be offered a second year, or oftener; but always with this proviso, that no premium would be given unleſs for those new kinds that were found, upon a fair comparative trial,

to exceed the old: and with a view to make that comparative trial with accuracy, as many sets of the best kind should be reserved, as to be sufficient to make the trial.

Hitherto I have supposed the experiments are confined to those kinds of potatoes that come to perfection before the first of August (for great are the benefits to be derived from early sorts, in comparison of those that are later); but as any kind of potatoe that arrives at perfection before the first of October may be very useful, it might perhaps be advisable to offer the same premium each alternate year (as long as the Board should choose to continue them) for the best kind that should produce the greatest produce (not under at the rate of *forty* tons per acre) that had attained their full maturity in an ordinary season before the *first of October.* I set the quantity of these last at ten tons larger than the former, because I think it is not only posfible to attain that produce, but likewise because I should suppose the value of thirty tons of the first would be, on an average of years, equal to that of forty tons of the last; for which reason none but those of a very great prolificacy ought to be admitted to a competition.

I shall not add more to the length of this esfay, than barely to take notice of one peculiarity of the potatoe that ought not to be overlooked. There are doubtlefs potatoes, like apples, which eat best when just pulled from the tree, and lose their flavour very soon by keeping; some kinds eat best when newly taken out of the ground, and gradually become worse the longer they are kept. There are others which, on

the contrary, are very indifferent when newly dug up, that gradually get better, and come to their perfection only in the spring of the year. I had once a kind that was very indifferent for eating till towards the month of March; but which, from that period till the month of August, if care was taken to prevent it from germinating, continued as mellow and mealy as could be desired. This is a very valuable peculiarity, and ought not to be disregarded in a disquisition of this sort.

P. S. I find I have forgot to take notice, that on the plan of premiums proposed, the first comparative trial could not take place till three years, at least, from the time of advertising it; as that space would, at least, be required for increasing the plants from the selected kinds. Indeed it would require four, five, or six years before the experiment could be tried with the fairest prospect of succeſs; so that, if the premium was to be continued for succeeding years, it should be so announced at the beginning, that people may prepare themselves for it. Experiments in agriculture are slow; nor is it poſsible to accelerate them beyond the limits that nature has prescribed; whoever attempts it must have the mortification to see their aims entirely frustrated. How many excellent improvements have I known neglected, because in looking forward to them, the time to bring them to perfection appeared to be long; yet when that time was past, it seemed very short, and the mind was filled with regret that the improvement had not been made! Yet the same consideration prevented the attempt a second and a

third time; and that thing was never done, which, in the course of the same man's life, might have been done perhaps a dozen times over.

On the British Constitution.

[*Continued from page* 227.]

We have already had abundant proofs of the indefinite notions our forefathers entertained respecting what we now call the *constitution* of this country; but many other proofs of the progress of their ideas on this subject remain to be adduced.

OF THE ORIGIN OF KNIGHTS OF SHIRES AND BURGESSES.

No idea was entertained for many ages by our warlike ancestors of delegating others to act in their stead in the grand national assembly. All the tenants *in capite* had a right to attend there personally; but, as it became inconvenient for those of small fortune to attend there, these gradually absented themselves, so that it became at length customary for none but the prelates and nobles and great lords to frequent these meetings.

The general summons for all the tenants in chief to attend parliament, as mentioned in the *Magna Charta* of king John, not being enforced by any penalty, had, in all probability, been disregarded before the days of Henry III. so that the whole power of parliament would centre in the archbishops, bishops, abbots, earls, and greater barons. From this consideration,

Simon de Montfort, who had become very obnoxious to these great feudatories, and dreading their power, with a view to counterbalance that influence, did, in the year 1264, order the sheriffs to cause two knights to be chosen from each shire, and two burgeſses from each borough, to be returned to parliament. Thus was a small portion of the leſser tenants in capite selected by the crown to form a body to counteract, in some measure, the weight of the greater lords: nor does it seem that an idea was at this time entertained, either by the crown or the people, of forming a separate body of delegates from the lower claſses of the people with a view to be under the influence in any way of those who were not summoned to attend. It was merely an exertion of power by the crown to effect a particular purpose at the time, without any view to the distant consequences that might result from that measure. The persons so nominated by the sheriffs were forced to attend, and there can be no doubt that this service would be deemed by them a hardship, with which they would only comply with reluctance. Accordingly we find that it was wholly discontinued for the space of twenty-six years; and when Edward the First did, afterwards, adopt the same measure, probably from views similar in kind to those of Montfort, so backward were the deputies in their attendance, that it was found neceſsary not only to order the constituents to pay their expences while attending parliament, but even also to require each deputy to enter into a recognizance with two sureties, under a penalty, that they would attend when so summoned.

Anno 1290, Edward the First ordered, for the first

time, two *knights* to be sent from each county.[a] The same order is repeated anno 1294;[b] but it was not till the year 1295 that *burgesses* were ordered, by him, to be sent from the cities.[c]

ORIGIN OF THE HOUSE OF COMMONS.

From this time, for about forty years, this mixed body, consisting of the dignified and inferior clergy, the nobles, and the representatives of counties and of cities, sat as one body. But, in the year 1332, the bishops, with the proctors of the clergy, probably from the contempt they entertained for the knights and burgeſses, withdrew by themselves, the nobles by themselves, and the representatives of the commons by themselves.[d] Here then is the first embrio of the house of commons; but how much unlike to the respectable aſsembly which now bears that name! Instead of claiming a right to judge of every particular respecting government, the commons, for many years, declined to give any opinion on this subject, as "too high for them to know;" and when preſsed to give their opinion as to the propriety of a war in the year 1348, they say "they are not able to advise any thing concerning the war, and desire that the king will be advised by his nobles and council; and what should be determined by them, they would consent to and confirm."[e]

Again, in the year 1373, a committee of the commons was sent, in the name of the rest, requesting, "that they might have some bishops, earls, and ba-

[a] Brady Bur. p. 26. [b] Ibid. p. 29. [c] Ibid. p. 35. [d] Parl. Hist. v. i. p. 214.
[e] Ibid. p. 268.

rons, to aſsist them in their deliberations,"[f] which was granted. Anno 1377, they again pray the king, that, "*from the weakness of their abilities, to advise the best*, he would be pleased to let certain prelates and lords be joined with them on such weighty affairs,"[g] which was also granted. The commons renewed the same petition next year, but the lords would not aſsent to it.[h] The commons, however, still diffident of their own abilities, renewed their petition again in the year 1383,[i] which was once more granted to them. Even as far down as the year 1394, the king having charged the commons to give their advice as to the war, the commons declared, "that they considered these points *were too high for them to meddle with*, and therefore they durst not treat of them, nor give any advice."[k] Such was the house of commons at its origin, and such, it may be expected, will every aſsembly of the same sort be at its origin. Men do not, for ordinary, paſs at once from ideas of servility to those of a well-regulated freedom. It is but by degrees that changes on the state of the human mind are usually effected.

PRIVILEGES OF THE COMMONS.

The commons being now *obliged* to aſsemble by themselves, began, by very slow degrees, to model their meetings into a regular form. It was not till the first of Richard II. anno 1397, upwards of forty years after they had formed a distinct deliberative body, that they elected *Sir Peter de la Mare* knight of the

[f] Parl. Hist. v. i. p. 318. [g] Ib. p. 338. [h] Ib. p. 353. [i] Ib. p. 373. [k] Ib. p. 453.

shire for Hertfordshire, as president of their body, under the name of *speaker*; an office which has been ever since esteemed of the greatest dignity. But so little were those privileges of the house known, which are now justly deemed of the very highest importance, that the same Peter de la Mare was, during the former reign, at the suit of Alice Piers, or Pierce, the king's mistress, condemned to perpetual imprisonment, for speaking boldly against her in parliament; from which sentence he was freed only at the accession of the present king;[l] and in the year 1397, *Thomas Haxey*, clerk, a member of parliament, was condemned to die for having moved, in the house, a bill for avoiding the extravagant expences of the king's household, and to forbid bishops and *ladies*, who had no business there, from frequenting the court;[m] nor was this severe sentence mitigated, but at the earnest and *humble* intercession of the prelates, "who besought the custody of his body, *not as a right belonging to them, but of his majesty's special grace and favour*," which was at last granted to them. Members of the house of commons were, therefore, totally debarred from liberty of speech, long after they constituted a distinct body in the legislature.*

MODE OF GRANTING SUPPLIES.

If it was long before the commons attained the valuable privilege of liberty of speech, it was longer still

[l] Speed, p. 589. [m] Parl. Hist. v. i. p. 48.

* Every one knows with what a high hand even Elizabeth checked freedom of speech in parliament, though she had the address not to provoke a strong opposition to her high prerogative claims by well-timed acts of condescension.

before they claimed the exclusive privilege of bringing forward money bills. It has been already made appear, that till after the year 1298, all grants of money were entirely by the prelates and the peers, without the smallest participation of the commons. Thus, for the payment of the ransom of Richard I. for liberty of tournaments, every earl gave 20 merks, every baron 10 merks, every landed knight 4 merks, and every knight of fortune 4 merks.[n] So far were the *commons* from being considered, on these occasions, at an early period, as capable of granting or withholding supplies, that they seem to have been subjected to the exactions of the great lords at the pleasure of the crown. Thus, anno 1224, the barons gave to the king two shillings for every plough land; and the king, in return, granted the barons two merks sterling of every knight's fee, *to be levied of their tenants.*[o] In every case, before the commons were summoned to parliament, all grants were universally given by the clergy and the nobles; and even long after the commons were summoned to parliament, the grants were made in name of the nobles. Thus, 1323, in the 16th of Edward II. when that unhappy prince demanded a pecuniary aid in parliament from the *clergy* and the *laity* to discharge the ransom of John earl of Richmond, who had been taken prisoner by the Scots at the battle of Byland in Yorkshire, this proposal was refused by the *barons*, for this reason, that no such tax ought to be raised but for the ransom of the king, queen, or their eldest son.[p] After this time, grants were, for many years, usually given by the *prelates, barons, knights, and burgesses*, each

[n] Parl. Hist. v. i. p. 18. [o] Ib. p. 24. [p] Ib. p. 178.

separately for themselves. Thus, *anno* 1332, the *prelates, lords,* and *knights of shires* granted a fifteenth of all their personal estates, and the *cities* and *boroughs* a tenth.[q] Observe, that although this was the year in which the commons were compelled to sit by themselves, they do not act as a common body of men in one uniform manner, but continue as they had done before, each clafs to grant a particular afsefsment for itself. The knights of shires give a fifteenth, as the prelates and lords had done, and the cities and boroughs the larger afsefsment of a tenth. Anno 1334, the *lords* and *knights of shires* grant a fifteenth, the *prelates* a tenth, and the *burgesses* the same;[r] anno 1336, the *nobility* and *gentry* grant a twentieth, the *citizens* and *burgesses* a tenth, and the *clergy* a sixth.[s] In the year 1339, the *nobility* gave every tenth sheep, fleece, and lamb of their demesnes, the *commons* declared themselves willing to grant an aid, but desired time to advise with their constituents, which was allowed, and they afterwards granted 30,000 sacks of wool.[t]

Hitherto the grants of each order of the people are always kept separate, according to the ancient custom; but in the next parliament, 1340, we find a small variation in the stile. The *lords and commons* grant the king,[u] &c. Anno 1344, the *clergy* granted a triennial tenth, the *commons* granted the king two fifteenths of the commonality of the land, and two tenths of the *cities* and *boroughs*. Soon after the *commons* gave another fifteenth. *The lay lords granted to pass over*

[q] Parl. Hist. v. i. p. 213. [r] Ib. p. 421. [s] Ib. p. 223. [t] Ib. p. 230. [u] Ib. p. 239.

seas, and adventure themselves with the king, and are therefore not found upon the roll as taxed.[x] Anno 1347, the *commons* granted the king an aid of two fifteenths, and this is the first instance of the commons in parliament granting an aid without mention of the nobles.[y] The reason is obvious, the nobles were then personally with the king, and granting their aid in this way. To this accidental circumstance do we probably owe the origin of the idea that all the supplies are given in Britain by the commons. Anno 1352, a grant in parliament is given of three-tenths and three-fifteenths by the lords and commons.[z]

As far down as the year 1383, the king addreſsed himself in a particular manner to the lords, when demanding a supply; and hereupon the lords and commons granted, &c.[a] Anno 1380, the *commons* desire the *lords* to name the tax, which they accordingly do, and the commons agree to it.[b] This was the famous capitation tax that occasioned the rebellion of *Wat Tyler*. The *prelates*, at this time, refused to be taxed in parliament, and said they would only tax themselves in convocation, "as had been usual heretofore."—Still, anno 1383, the grant runs, *lords and commons*.[c]

The first notice that I have found of a grant in parliament by the *commons*, nearly in the form now used, was in the first parliament of Henry IV. anno 1398.[d] The words are, "The *commons*, with the aſsent of the *bishops* and *lords*, grant, &c." and this form gradually began to prevail more and more from that time forward till the present day.

[x] Parl. Hist. v. i. p. 258. [y] Ib. p. 263. [z] Ib. p. 277. [a] Ib. p. 378.
[b] Ib. p. 360. [c] Ib. p. 383. [d] Ib. v. ii. p. 38.

ASSEMBLING OF PARLIAMENT, &c.

One other particular, which was long unsettled, as might naturally be expected, was the procedure neceſsary to be observed in convocating a parliament. In the infancy of a society, it could not be foreseen that many abuses could originate from this source, and therefore no steps would be taken to guard against it. The king would be expected to send such a summons to all as should be generally understood, and nothing more would be required. But, in proceſs of time, when the people became numerous, and much dispersed, the king took occasion to omit to summon such as he thought might prove adverse to his wishes, or to call on others, with rigour to attend, who wished to be excused; so that it is not to be doubted, but grievous abuses and oppreſsions were practised under this guise. So intolerable had these abuses grown before the time of king John, that it was judged of sufficient importance to have an article provided in the Magna Charta to guard against this evil.

Accordingly the barons obliged John to come under the following engagements. The words translated from the original French are these. "And as for coming to the common council of this kingdom, and for aſseſsing aids, except it be for our ransom, for making our eldest son a knight, or for marrying our eldest daughter once, we will cause to be summoned the *archbishops*, *bishops*, *abbots*, *earls*, and the *greater Barons*, each in particular, by ourselves. And moreover, we will cause to be summoned by our sheriffs and bailiffs, *all that hold of us in chief*, at a certain day, 40 days after at least, and at a certain place; and

in our letters we will expreſs the cause of the summons."* In the 39th parliament of Henry III. 1255, this abuse had been felt, for the lords refused to grant any supplies, because "all had not been summoned according to the tenure of their charter."[e] This, however, did not produce the desired effect; for sometimes more, and sometimes fewer of one particular order were called upon or omitted. Thus, 1265, only 11 bishops, 5 earls, and 18 barons were summoned to parliament, and 64 abbots, 37 priors, and 5 deans;[f] and in 1297 a parliament was summoned, in which the clergy were entirely omitted.[g] After the representatives for counties and boroughs began to be chosen, the sheriffs were sometimes ordered to send one, sometimes two or three, or even four for each county; and the number of cities were more or leſs, as the king inclined. Frequently also, the members were nominated by the crown. Upon the same principle, Richard the Second called to the house of peers the judges and privy counsellors, who had not till then been admitted into that house. He also claimed the privilege of calling to the house of peers, by name, such knights as he judged proper, although they did not hold their lands of the crown by barony.[h] Many other irregularities of the same sort occur in reading every page of the parliamentary history of this country.

Thus, anno 1352, 26 Edward III. only one repre-

* It is plain, from the above quotation, that in the time of John, no idea had as yet begun to be adopted of *what* we now call *representation*; as all the leſser *tenants in chief* are to be summoned indiscriminately.

[e] Parl. Hist. v. i. p. 57. [f] Dugdale, p. i. [g] Parl. Hist. v. i. p. 105.
[h] Seld. Tit. hon. p. 591.

sentative for each city and burgh was summoned to the parliament, which met at Westminster; and only one knight from each county was summoned to that which met the year after at the same place, though two representatives for each city and borough were called to this last:[i] and in 1371, the king summoned a certain number of prelates and lords, together with *one half* of the knights, and citizens, and burgeſses, who had attended the last parliament, *all named by himself*, to meet at Winchester, June 8th; which aſsembly acted as a parliament.[k] Anno 1296, the sheriffs are ordered to return *two* or *three* knights from each county, but no citizens or burgeſses. Accordingly Suffolk, Cambridge, Norfolk, Huntingdon, and Cumberland, returned each three knights, and all the rest two.[l] Again, anno 1295, the king directs letters to all his sheriffs to choose *two* knights from each county. *Teste Regi apud monast.:* 8 *die Octobris*; and next day he directs other writs to choose two more knights for each county.[m] Anno 1372, dubbed knights, and none other, are ordered to be returned, and burgeſses who had the greatest skill in shipping and merchandising.[n] Anno 1282, two representatives are ordered to be summoned from each county; and two burgeſses from each town; the towns being then only twenty-one in number that were ordered to make returns.[o] Anno 1301, the king orders the same persons to be returned as had attended the last parliament.[p] Anno 1362, a parliament was holden at Westminster, in which none were permitted to appear

[i] Brady Intr. p. 158, 160. [k] Brady, v. ii. p. 161. [l] Brady Bur, p. 26.
[m] Ib. p. 29. [n] Parl. Hist. v. i. p. 312. [o] Ib. p. 86. [p] Ib. p. 114.

by *proxy*, and where consequently there could be no representatives.[q]* Anno 1306, a parliament is summoned for giving an aid, and for knighting the king's son. The bishops and abbots are summoned, *nominatim*, to come by themselves *vel procuratores vel attornatos vestras:* the knights, citizens, and burgeſses, ordered to be summoned by the sheriff, two knights for each county, two citizens for each city, and one or two burgeſses for each borough, as they are large or small.[r] He is ordered also to send the archbishops, bishops, priors, and *other religious* in his county to parliament.

From these and other documents, it appears that no fixed rule for summoning parliaments had been adopted in the fourteenth century. In some of the parliaments of this reign [Ed. I.] Mr. Brady, with justice remarks,[s] the smaller barons were represented in each county, some by two, some by three, and some by four commiſsioners; and the representatives of cities and boroughs was still more imperfect. We even meet with one parliament in this reign in which there was not so much as one clergyman, and with another, in which, not only the archbishops, bishops, abbots, and priors, but even the archdeacons, with a representative of every chapter, and two representatives of the inferior clergy, in every diocese, were called:[t] and Henry the historian, with great truth, remarks, that the two first

[q] Speed, p. 584. [r] Rymer, v. ii. [s] Intr. g. 151. [t] Brady, Intr. p. 155.

* This was very near a hundred years after Simon de Montfort had first ordered burgeſses and knights to be chosen as *representatives*; so that it seems, even thus long, to have been looked upon as an indulgence of the crown, which they might grant or withhold at pleasure.

Edwards seem to have modelled the parliament as best suited their views, sometimes one party being omitted, and sometimes another.[u] And that the number of boroughs and towns was altogether unfixed in the time of Edward the Third.[x] That these things were so, will not surprise any person who seriously reflects on the effects of gradual changes which the progreſsive state of society produces, and the uncertainty of ideas that must, for some time, prevail before measures can be adopted to suit the circumstances of the times. It is now considered as a great privilege for a place to be entitled to send representatives to parliament; but at the period here under review, this was viewed rather as a vexatious duty. Men *now* solicit to be members of parliament;—*then* they were so backward in the discharge of this duty, that it was found neceſsary to enact, [14 Ed. I.] that each representative should find three sureties that he should attend parliament.[y] At the same time the counties and cities were bound to pay the expences of their representatives in parliament. When this duty was therefore performed with so much reluctance, it is no wonder if the king was allowed, without challenge, to omit summoning such as he might find suited his purpose to keep away from the national aſsembly.

[*To be continued.*]

[u] Brady, Intro. v. iv. p. 288. [x] Ib. p. 289. [y] Brady, Intro. p. 153.

ON THE BOMBYX ELINGUIS, &c.

To the Editor of Recreations in Agriculture, &c.

May 15, 1801.

SIR,

At the conclusion of your first series, you profeſsed that one of your objects in those eſsays

was to accustom your readers to take notice of such facts as fell under their own cognizance; to reason upon them with freedom, but divested of prejudice, and to draw the neceſsary conclusions with candour and impartiality; and surely this was an object worthy of a cultivated understanding: But was it so of a prudent one? You certainly never suspected, when you set people to seek after knowledge, that they would find many difficulties, many perplexities to obstruct their course; And to whom can they apply in their distreſs but to you, the author of it? And, from what I have seen, the applications have not been few; and I shall not wonder if I hear your hall is as much crowded for admittance in a morning as those who give out their hand-bills to answer all lawful questions. Thinking, therefore, at present you have full employment on other subjects, I will satisfy, as far as in my power, the queries of Ignoramus. The perfect insect is described as follows by Linnæus:

Neustria—Bombyx elinguis alis reversis fascia sesquialtera subtus unica.

Habitat in arboribus—ova ponit confertiſsime copioſiſsima circum ramulos arborum instar annuli: nobis vulgatiſsima larva subpilosa lineis albis rubris cæruleis veruca super anum.

This is a perfect and clear description of the insect in question; but, further to satisfy your correspondent, I add, the immense multitude of small blackish coloured caterpillars, crowded together as he justly and particularly observed, are the caterpillars of a moth known to the collectors of English insects by the name of lacky, given it on account of a stripe along the back

of the caterpillar, in appearance something like the lace worn by livery servants on their clothes, composed of blue, red, and white, but wherein the blue is most predominant. They change their skins about five times before they enter into the chrysalis state, wherein they lie a little more than a month, after which they come into the state of a moth, whose wings expand about an inch and a quarter, of a fox colour, with two cream coloured bars on the superior wing. During the continuance of the caterpillars in their first and second skin, they are generally gregarious, feeding together in a web, but afterwards they spread themselves over the whole tree, and sometimes create such devastations on young fruit trees in nurseries as totally to destroy them. They principally attack plum-trees, apple-trees, and pear-trees. I have also taken their eggs from a branch of the peach-tree. They are exceeding common, though their eggs have been seldom noticed, and gentlemen fond of a microscope frequently introduce them as one of their most curious objects.

X. V.

ON THE ROSE-TREE INSECT, &c.

To the Editor of Recreations in Agriculture, &c.

SIR, London, May 9, 1801.

In adverting to what was said in page 136 of your second volume on the subject of rose-trees, it was far from my intention to give offence to your correspondent. I observe that I made use of a word that was too comprehensive, which both of you disapprove, yet I cannot avoid remarking, that what has been said on the subject in your *last* Number adds

very little to the *natural-history* of the insect in question. Merely knowing the name of an insect, is not knowing the history of it; and what is advanced concerning the egg being deposited in the autumn close to the bud, rests entirely on opinion, the arguments for which *you* do not admit to be conclusive. From the circumstances of these insects in some instances attacking the first leaves that are evolved, in others the second set of leaves, and in other instances the rose bud itself, I am inclined to think there is as great a probability of the insect depositing its eggs in the spring, after a genial warmth has aroused it, as well as the vegetable on which its offspring is to feed, into action, as in the autumn. But this is all conjecture; and, until the various changes of this insect are exactly, and the effects produced by it are satisfactorily accounted for, it will remain a matter of astonishment to me, that the trees which last year were so devoured by this insect as not to have a sound sprig upon them, should be this year very little injured, although they were not pruned down lower than the year before. I have found these insects on the *suckers* of the rose this week soon after their appearance out of the ground, which seems to correspond with the idea of the egg being deposited in the spring.

Your account of the tenthredo I have found very useful, and I have no doubt that any one may, by attending to your directions concerning them, keep their gardens tolerably free from that destructive insect. I discovered this fly in my garden last Saturday for the first time this season, and I have since then destroyed eight of them out of twelve that I have seen. A small

paper bag held in one hand near the insect, whilst I beat it into the bag with the other, I find an expeditious and almost certain way of catching them. The importance of killing the *fly* you have sufficiently stated, and no one who thinks at all on the subject can doubt; but in addition to that, I should be glad to ascertain where the chrysalis of this insect is usually to be found. I last year kept some of the caterpillars in paper bags, and fed them till they changed into the chrysalis state, by which means I was enabled to distinguish this from any other, yet I could never discover one about my garden. One of your correspondents, page 275 of your second volume, says they are deposited in the autumn at the bottom of the stem of the tree; but I searched there for them in vain. All those chrysalides which I reared were uniformly attached, by a quantity of silky threads, to a leaf curled up, so as almost to surround them. The caterpillars I yesterday observed for the first time this spring.

The phalæna I find particularly troublesome, and destructive to currant and plum-trees, which are nailed to pales in my garden; I can easily account for it by an adjoining garden being totally neglected; but what I have to observe on this insect is its early appearance this year, many of the caterpillars being in motion about the middle of January, and I killed an hundred of them at least before February was out.

I shall intrude no longer on your patience than just to remark that, as your work is intended for the *recreation* of the general reader as well as the classic scholar, the Latin sentences dispersed through it require, for the accommodation of the *English* reader,

to be translated and given in an *English dress.* I think, when we consider that few ladies study Latin, and that a great many men never learn it in their youth, two thirds of your readers, it is likely, do not understand it. Wishing good succeſs to your publication, I remain yours, H. G. H.

The hints above given shall be attended to. Edit.

On the construction of patent hot-houses, where artificial heat is required.

From the circumstances that have been explained in the preceding parts of this eſsay, it has been found neceſsary to have recourse to artificial aid for producing heat on innumerable occasions where that could never have been wanted; but there are *some* occasions in which the use of fuel for augmenting the heat becomes indispensable. The object of our present inquiry is, to ascertain the manner in which a given quantum of heat may be produced with the smallest consumption of fuel. To ascertain this point, perhaps, the easiest method will be to shew some of the most striking defects of the ordinary practice, that we may thus be led to discover how these may best be avoided.

Hitherto the heat of a fire has been communicated to hot-houses invariably through the intervention of a *flue*; that is to say, a chimney carried up in the thickneſs of the wall in a direction chiefly horizontal, rising upwards from one horizontal bed to another, till the pipe of the chimney attains to such a length as is deemed neceſsary, after which it is conveyed to

the top in a perpendicular direction till it surmounts the building, where it iſsues into the common atmosphere.

After this mode of construction, it is obvious that much of the heat must be lost for the purposes intended. The heat communicated to the bricks on three sides of the flue tend only to heat the wall; and even that heat which paſses through the bricks in front acts but in a very feeble manner in heating the house; for no sooner is that portion of the air that touches the wall heated, than it rises directly upwards, and is suffered to make its escape nearly as fast as it is generated through the crannies between the roof-glaſses; so that its influence is never felt in the area of the house until the fuel is so augmented as to heat the air faster than it can effect its escape through the crannies of the roof. It is precisely as if you were pouring water through a funnel; if the stream that flows in be no greater than will fill the pipe of the funnel, you may continue to pour water into it for ages without making it one bit fuller: an accumulation of water can only be made when a greater quantity is poured in than can flow off through the funnel; but still all that fills the funnel runs to waste; and in a very short time after you cease pouring, the whole accumulated water runs off. The small portion of the heat that is produced by the burning fuel, which finds its way through the front bricks of the flue, is thus carried instantly off, unleſs a superabundance of it be produced. It is indeed accumulated in some degree when the fire is raised very high; but the moment it abates, the superfluous heat flies off. The fire indeed may burn

moderately for days together without heating the house in any perceptible degree: nor is it poſsible to compute the quantity of fuel that may be thus *uselessly* expended.

But, as if this unobserved source of waste were not enough, there are other circumstances respecting flues that concur in heightening this effect, while they tend at the same time most powerfully to derange the whole economy of vegetation, and produce diseases in plants that tend most effectually to frustrate the views of the owners of such houses.

Not only does the fuel burn without any beneficial effect, so long as the fire is below a certain degree; but whenever the fire comes to be by accident, or otherwise, wholly extinguished, the flue, and all the bricks that surround it, are, by one of those neceſsary laws of nature that unavoidably operate under these circumstances, reduced to the same temperature with the atmosphere with a degree of celerity that could not have been effected by any other means. The smoke ascends up the chimney in consequence of its being filled with air that has been heated in paſsing through the fire; and that heated air with which the pipe of the chimney and flue is filled, even after the fire is extinguished, must neceſsarily ascend through the chimney, and make its escape out of the top; and to supply its place *cold* air must be introduced from below. This proceſs must go forward so long as any heat remains in the bricks that surround the flue. Thus is a stream of *cold* air made to paſs rapidly along the flue, washing it, as it were, and car-

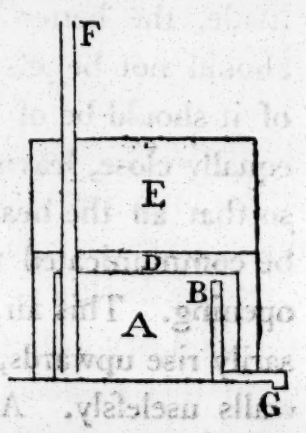
rying off every particle of heat in the shortest time posſible.

These are inevitable and undeniable consequences that must result from every attempt to heat houses by means of flues carried up within the walls; and, although some improvements may be, and have been made, to improve their construction, by means of which some of these evils may be *partially* mitigated, yet these are, in effect, and ever must be, so trifling, that it is not worth while to stop to point them out. They appear, indeed, to be at the best such trifling palliatives as render it expedient to abandon them entirely, and to adopt the following more economical and efficacious mode of conveying heat:

Let the heated smoke, as it comes from the fire, be conveyed into a chamber, or reservoir, placed under the hot-house, and extending the whole of its length and width. This chamber is to be covered above with iron plates, or tiles, made air-tight, so that the heat may be transmitted through it without admitting paſsage for any smoke. The deeper this smoke chamber is made, the better it will answer the purpose; but it should not be leſs than two or three feet. The sides of it should be of the same materials as the roof, and equally close, leaving an interval all round of two feet; so that all the heat that paſses through the sides will be communicated to the air that is contained in this opening. This air, as soon as it is heated, will neceſsarily rise upwards, without being lost, or heating the walls useleſsly. Above the smoke-chamber, leaving an interval of one foot at least, is to be laid the floor of the hot-house, of stone, or flooring tiles, so closely

jointed as to be air-tight, as well as impervious to water. Under this arrangement, it is obvious, the whole heat that paſses from the smoke-chamber must be communicated to the air that surrounds it, which must act with its whole force in heating the floor of the hot-house; and whatever heat pervades that floor must be diffused equally throughout the whole of the hot-house, which it must warm alike in all its parts, as it ascends to the higher parts of the house, without being lost in the walls. Not only will the heat thus transmitted operate without any waste; but this heat may be farther augmented at pleasure by opening, when it is wanted, one or more pipes that go through the floor into the air-chamber; so that heated air may be admitted from thence in whatever proportion circumstances shall render neceſsary at the time.

The annexed diagram, which represents a section of the building, will serve to explain the construction in a more satisfactory manner than can be done by words alone. Let A represent the smoke chamber communicating with the fire place C by means of the pipe B; D the air chamber surrounding it every where but at the bottom; and E the hot-house itself, surmounted by its reservoir-chamber, as described in our last. F represents the tube, or chimney, for carrying off the smoke, and giving ventilation to the fire. This communicates with the smoke-chamber only at the bottom close above the floor; and is represented in its present position



merely to explain the manner in which it operates (for it ought properly to be placed at the back part of the building). The current of heated air mixed with the smoke, it thus appears, must pafs from C to B, where it diffuses itself in the smoke-chamber, and in which the hottest part of it will ascend to the top, and retain its station there at all times. The coldest part of the air in that chamber will, of course, be at the bottom, where the chimney communicates with that chamber; so that the whole of that cold air must first be drawn off before any part of the heat can be suffered to escape. In this way the chamber may be filled with heated air and smoke, without losing scarcely a single particle of the heat; and if, at that time, the top of the chimney at F be completely closed, and the air-hole of the furnace shut, the fire will be then extinguished, while the warmth of the chamber A will be gradually communicated to the air in the chamber D, without losing one particle of that heat; for the whole of the heat that pafses through the *sides* of the smoke-chamber will of course rise to the top, and there act directly on the floor of the hot-house; or be allowed to rise into the house itself through the pipes before mentioned (and which will be afterwards more particularly explained), if judged proper.

To the philosophical reader some difficulties will here occur, which will be easily obviated. He will perceive that there would be some difficulty in making the chimney *draw* well at the first lighting of the fire upon this mode of construction; but he will at the same time perceive, that if a chaffing-dish of burning coals were to be placed then in the chimney F, and

allowed to burn for a short time, that inconvenience will be entirely removed: and, after the air in the chimney shall have been once heated, this inconvenience never can be again experienced, provided the fire be not permitted to lie so long dormant as to suffer the heated air in the chimney to cool entirely. The chimney might be made to *draw* at the beginning by opening a hole into it, at that time, near the roof of the smoke-chamber, which could be closed after a proper current had been established; and by several other means which need not be here enumerated.

No sooner will the fire be extinguished, than the air in the smoke-chamber will begin to cool; and this coolneſs will continue to augment, if it be not prevented, until it acquires the same temperature with the open air. As it cools, the bulk of the air in the smoke-chamber will be diminished; to supply which diminution in bulk, some cold air must be suffered to enter from without; and if the register of the fire-stove be closely shut (which it ought to be when the fire is to be extinguished), there will be a neceſsity to provide an opening that communicates with the external air and the air-chamber. If this opening be made near the bottom of the chamber, it will tend very little to diminish the effect for a considerable time; for, by this means, the cool air that enters will preserve its place at the lowest part of the chamber, without intermingling with the warm air above; and consequently it will continue to act in heating the air above the smoke-chamber with very little abatement.

In this manner an equality of temperature may be kept up for a very long time, although the fire should

be extinguished, and only occasionally lighted; and these intermiſsions may be longer in proportion to the depth of the smoke-chamber, the quantum of accumulated heat being always in proportion to that depth. Nor will the heat be suddenly augmented to the house when the fire is renewed; for not only has it then room to dilate itself downward in the smoke-chamber, but time also must be required gradually to act upon the air above it, which may be only suffered to act upon the hot-house after a considerable period. And even then it may be regulated by admitting it through the pipes in larger or smaller quantities in proportion to the degree of heat it bears at the time.

As it will be at all times inconvenient to make the chamber for heated air of great depth, and as it will tend to preserve an equality of temperature the longer, the larger that body of heated air can be made, it will be a great advantage to have an auxiliary air-chamber made to communicate with it, after the manner described for the hot-house (page 132); thus to augment the quantity of heated air to any aſsignable degree. This auxiliary air-chamber may be made of any convenient form, and may be above the level of the principal air-chamber if neceſsary. All that will be required in this case will be, that the pipe which serves to convey the heated air from the one to the other chamber should iſsue from the *lower* part of the principal heated-air-chamber (though admitting to be occasionally raised, by slipping a pipe upon it like the nozzle of a watering-pot), and opening into the *higher* part of the auxiliary chamber, that thus the hottest part of the air may be drawn back; an opening being

made to the external air from the *lower* part of the auxiliary chamber, which should never be closed, upon the same principle as has been already explained (page 134).

By means of these contrivances, the fire may be suffered to burn for a considerable time without either augmenting the heat in the house to an inconvenient degree, or suffering scarcely any part of that heat to be wasted by flying off through the chimney: and when the fire is extinguished, it may be suffered to lie dormant for a considerable time, without producing any sensible abatement of heat in the house. How long these intermiſsions may be, will vary from circumstances that are sufficiently obvious not to require to be enumerated: nor could the exact limits of it in any one case be at present ascertained with precision, as experience hath not yet established the facts. But those who reflect will easily perceive that the intervals must be much longer than it would be prudent here to hint at.

It is proper here, however, to observe, that many economical advantages will be derived from a due attention to the management of the *fire* in this case as well as in other hot-houses; and the mentioning of this becomes the more neceſsary, because it is a particular that I have reason to believe has been hitherto very little adverted to in the management of hot-houses, from which much unneceſsary waste has been incurred. It, therefore, requires to be distinctly pointed out.

When fuel is consumed *slowly* in a grate that communicates with a flue, that is, by admitting a great quantity of *unheated* air to paſs up the chimney along

with the smoke, it may continue to burn for an indefinite length of time, without communicating any sensible heat to the house, this heat being merely sufficient to warm a little the inside of the flue, without being ever strong enough to pervade the thickneſs of the brick, so as to operate sensibly on the house; thus may much fuel be consumed purely by running to waste. Were the heat, however, augmented considerably beyond that degree, it would quickly pervade the whole thickneſs of the brick, and thus warm the house; so that in this way a smaller quantity of fuel would do good. It is true, indeed, that when the heat is thus raised in a flue of the common construction, a part of that heat must be diſsipated in the open air by iſsuing from the top of the flue; so that waste, to a certain degree, must be experienced in one way or other.

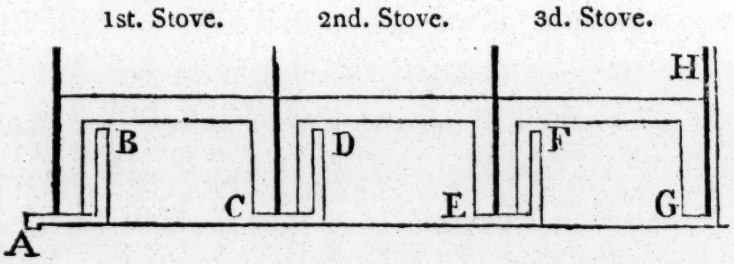
The waste, in either of these ways, will be wholly avoided upon our mode of construction; but a sensible variation in the effect will be experienced, even on this construction, when a very brisk or slow fire is kept up. Where a great degree of heat is wanted for the pine stove, for example, a great saving will always be experienced by burning a very brisk fire, and so managing it as to allow as little air as poſsible to get into the chimney that has not been much heated by being made to paſs directly through the fire: for, in this case, the smoke-chamber will be filled with highly heated air only, while the whole of the cold air that it formerly contained will be drawn up the chimney, so that the moment any heat is observed to paſs up the chimney, the fire may be immediately extinguished,

and no part of the heated smoke be suffered to fly off. Thus will the requisite degree of heat be obtained without any waste of fuel at all; whereas, had the fire been suffered to burn slowly, and a great degree of cold air been allowed to pafs into the smoke-chamber, the heat would be so feeble as never to raise that in the air-chamber higher than the requisite degree in the stove; so that the air from thence must be suffered to pafs *at all times* freely into the stove. In this way, not only would it be neceſsary to suffer a considerable portion of the heat to be lost by pafsing up the chimney, but waste of another kind would be incurred; for, as the heat in the air-chamber would be so small as not to expand that air much, and as it must then be allowed to pafs into the stove, a great quantity of external cold air would be wanted to supply that waste, *all* of which must be heated before it can be suffered to pafs into the stove: but when the heat in the smoke-chamber is raised to a *great* degree, it augments the heat in the air-chamber very much; so that a very small portion of that highly heated air, being let off into the stove, serves to warm a great portion of the air already in it. Thus, much leſs cold air requires to be admitted into the air-chamber than in the former case; not to mention the greater effect of the heat communicated through the floor in the last case than in the former. From all these considerations it appears that it will be much more economical, on this construction of a hot-house, to raise the fire quickly to a great degree, and suffer it only to burn for a short time, taking care that the whole of the air be made to pafs through the burning fuel, than to allow it to burn slowly and continue

it the longer. It might, indeed, be poſsible by burning a slow fire, to consume at least ten times more fuel (without producing the effect intended) than could have been required fully to effect it by exciting a strong fire for short intervals of time only.

When a succeſsion of houses of different degrees of temperature are wanted; as, *first*, the warmest stove for forcing the most forward pines, and other tenderest plants; *secondly*, a succeſsion-house for such plants as require a leſs degree of heat; *thirdly*, a vinery or peach-house for the most forward fruits, and so on, a succeſsion of smoke-chambers may be made to excite these different degrees of heat with much economy, in the following manner:

Let the smoke-chambers be divided from each other by partitions, corresponding with the respective partitions of the different houses above described, as is here represented.



The smoke paſses from the fire-place A into the first smoke-chamber at B, which is first filled with the hottest smoke by driving off the whole of the cool air through the paſsage C into the second smoke-chamber. After the whole of the cool air has been thus driven off, the first smoke-chamber will be completely filled with heated smoke; but the heat in that chamber will be different in a regular succeſsion, forming an

infinite number of layers, or strata of various degrees of heat from the top to the bottom, somewhat after the following proportions, which, for the sake of illustration, we shall suppose for the present to be thus arranged: reckoning only four strata or layers of heated smoke, one above the other, let us state the heat of the lowest stratum, which must always be at the lowest degree, to be as *one*; that of the second stratum as *two*; that of the third as *four*; and that of the fourth to be as *eight*. Let us farther suppose that, instead of extinguishing the fire when things are in this state, it shall be continued, and made to burn as before. The heat in the superior region of the smoke-chamber will continue to augment at the top, while the whole of the first stratum of heated smoke will be pushed through the opening C D into the second smoke-chamber D E, and afterwards the *second* heated stratum, and so in succeſsion the *third* and the *fourth*. When this has been done, the heat in the second chamber will be brought to the same degree as it was in the *first* when it began to send heated air into the *second*, while that in the *first* chamber will have augmented so much beyond it as that the first (or lowest) stratum will be as *sixteen*, and that in the highest stratum proportionally higher.

If the fire be still continued, the heat in the *first* chamber will continue still to augment, while that in the *second* augments proportionally, pushing forward the heated smoke from the bottom of the second chamber through the paſsage E F into the third chamber F G. And if the fire be stopped before that third chamber be filled, its heat will be in a small degree

augmented, without suffering the smallest particle of the heated smoke to pafs through the chimney G H, so that *none* of it can be lost.

When the fire is extinguished, and the heat in the smoke-chambers begins to be diminished: the air-hole near the bottom of the *third* smoke-chamber being now opened (for the purposes above described) the heated smoke will begin to be drawn back from the *third* chamber to the *second* through the pafsage F E, and from the *second* to the *first* through the pafsage D C; and thus the *hottest* part of the smoke contained in the secondary chambers will be drawn back, so as to occupy the coolest parts of the primary chambers succefsively, until they attain the lowest degree of heat that suits the purposes of the different houses respectively, when the fire may be re-lighted to renew the heat by a procefs similar to that which took place during the first heating of them, as above described.

When the heat in the primary smoke-chambers is thus augmenting, and pushing the smoke forward into those of a subsidiary kind, the air in the air-chambers above them will be acted upon with a proportionate power to the degrees of heat they respectively attain. That above the *first* smoke-chamber will be proportionally heated and expanded: openings being made from the *lower* part of the first air-chamber by means of a pipe that terminates in an open mouth near the higher part of the *second* air-chamber, the cool air that was originally in the air-chamber, that has not yet been rarefied by the heat, will first be forced out of it into the *second* air-chamber; then the *coolest* part of the heated air will follow it; and so, gradually,

those portions of it that are more and more heated will follow it; and so on till it be full, and then into the third, and from thence into the open air, through the hole left near the *bottom* of this subsidiary air-chamber, which should be always left open, as before described (page 134) if the heat be so long continued, and so little of it let off into the hot-houses, as completely to fill the *last* subsidiary air-chamber. When the fire is extinguished, and the whole allowed to cool, that superfluous heated air which was thrown into the auxiliary air-chambers will be drawn back, as above described respecting the smoke; so as to preserve an equality of temperature for a very long time. When the reader considers that the smoke-chambers have their heat prevented from diminishing, by drawing back the heated smoke after the same manner, he may easily conceive that a very long time must elapse after the fire shall have been extinguished, before any sensible diminution of the heat in the air-chamber below the *first* stove can take place.

But as it must happen, that the heat in these air-chambers respectively will be considerably higher just before the fire is extinguished than it will afterwards become, it behoves us to show in what manner things may be so managed as not to suffer this inequality of temperature in the air-chamber to have any sensible effect on the temperature of the hot-houses themselves.

It has been already shown, that the heat is at all times much greater at the top than the bottom of the air-chamber; and we are thus enabled to draw from thence, at any time, air that shall be heated to a

greater or lefser degree at pleasure. For, if the pipe through which that air is to be conveyed into the hot-house shall open into the air-chamber near the bottom only,—in other words, if it be long,—the air that will be thus admitted will be cool when compared with that which would be transmitted through a short tube that opened into the chamber directly under the floor. Hence it follows, that we may admit into the hot-house even cooler air from the *bottom* of the air-chamber, when it is heated to its greatest degree, than that which we can draw from the *top* of it after it has been suffered to cool considerably. By having pipes of different lengths, therefore, we may regulate the degree of heat at pleasure.

But, as inconvenience might be experienced from the use of many pipes, the same effect may be produced by *one* only, if constructed in the following manner: let one tube of milled iron, or other metal, slip into another so as to fit it, like the moveable nose of a common watering-pot; these tubes being so made as to admit of the innermost one being turned round within the other. Let four or more narrow slits, or narrow openings, be made in the outermost tube, in the same line, from top to bottom. Let that tube be pafsed through the floor of the hot-house, and fixed firm into it, the bottom of it being closed. Let an equal number of narrow openings, of the same dimensions, and at equal distances from the end, as those in the first tube, and in the same direction (but not in the same line) be made in the inner tube. Let it then be slipped into the other tube, and pushed to the bottom; and if it has been made longer than the first tube, it will project beyond

it, so as to admit of being grasped, for the purpose of being turned round at pleasure. If this tube be put into such a position as that none of the holes in it correspond with those in the other, it is plain that no air can be transmitted through it into the hot-house. Let two corresponding marks be made in the top of the tubes to denote when it is in that position; then turn it round, till the two lowest openings in each tube correspond, in which position air will be admitted into the inner tube at the *lower* part of the air-chamber, and thus suffered to pafs through it (the top being always open) into the hot-house. Mark this position also. After the same manner any of the other holes may be opened at pleasure, all the others being neceſsarily closed at that time; and if the positions be properly marked above when these holes respectively correspond, it will be in the power of the operator to open any one of them that he shall require, and thus to transmit the hotter or cooler air at pleasure.

In consequence of this arrangement, it will be in our power to prevent the house from being over-heated, even when the air-chamber is above its usual temperature, as well as from becoming too cold when the heat has fallen there to a lower degree; so that a renewal of the heat by rekindling the fire can only become neceſsary after *all* the air that has been heated above the temperature of the house shall have been first drawn back into the first chamber, and from thence, by means of the highest opening in the pipe of communication, been transmitted freely into the stove. It is not in our power at present to say how long the fire, under these circumstances, may be dis-

continued; but we can with certainty say, that scarcely a single particle of heat that is excited by the fire can be suffered to run to waste, as the whole is applied in the most direct manner to the purposes for which it was excited.

[*To be continued.*]

To the Editor of Recreations in Agriculture, &c.

SIR,

I WAS so much interested in what you said about iron rail-ways in the fourth volume of your Recreations, that it determined me to alter the route of an excursion I intended to make into the country this summer, from the westward to the northward; and I have now the satisfaction to say, that I have been highly gratified by examining, personally, most of those rail-ways which you described in the XXIIId number of your work; and I am convinced that others who may take the same method that I have done of satisfying their curiosity with regard to this particular, will think themselves abundantly repaid for their trouble. After being witnefs to the immense saving that will result from this mode of conveying weighty goods, and the facility with which roads of this kind may be made, without the use of water or other materials that cannot be commanded every where, it is impofsible for me to expref in adequate terms the idea that I have conceived of the extent of the improvements to which this mode of conveyance may give rise. And when we consider the advantages which our little island pofsefses in this respect above, perhaps, any other spot on the globe, from the abundance of our

coal-mines, and the quantity and goodneſs of our iron ores, it cannot fail to excite, in the bosom of every well-wisher of his country, ideas of the most exhilarating kind. Contemplating things in this point of view, I rejoice to find that a plan is in such forwardneſs for executing an iron rail-way on this improved plan so near to the metropolis as that which is to go from Wandsworth to Croydon; which will put it in the power of many persons to be witneſses of its practical utility, who might not otherwise have had it in their power to observe it for many years to come. I sincerely wish the undertaking complete succeſs.

With a view to contribute my mite towards the extension of such a beneficial improvement, I beg leave to suggest an alteration respecting one particular in the recommendation that you have given for having an iron rail-way from the Isle-of-Dogs-docks to the city of London, which I doubt not you will approve of. After having observed the rail-ways themselves, I cannot see any good reason for shifting the carriages from one set of wheels to another, when they are to go from the rail-ways to the street, as you have suggested. It is very true, that small wheels may be made to go on the rail-ways with great convenience, which could not be made to go upon the street; but the reverse of this seems to be by no means neceſsary; as I can see no reason why wheels of a convenient size, fitted to go on the streets, may not go equally well on the iron rail-ways. I examined these rail-ways under this point of view with great attention, and am perfectly satisfied that a wheel from four to five feet diameter, or more, with a tread from three inches or up-

wards in breadth, may go on the rail-ways as well as any other wheel whatever. The breadth of the sole of the rail-way is four inches; so that a large wheel with a flat tread (not circular, like the unwieldy broad-wheeled waggon wheels) could go upon these as well as any other wheel. For, although it be true, that, on account of the larger diameter of these wheels, it would be leſs difficult to make them surmount the *flange* than a small wheel, yet, as the horse must neceſsarily move always in the middle track, there can be so little tendency to draw them to a side, that there seems not to be the smallest reason to apprehend that they ever could be taken from the track of the rail-way. If this be admitted, it will follow that the same set of wheels may be employed for carrying the load the whole way from the wharfs to the warehouses in town, and that the only alteration that would be required when they were to come upon, or to leave the rail-way, would be, to hook to each waggon, when it was to go upon the street, a pair of convenient shafts for the horse to go into, and to take them off when these returned to the rail-way; a number of horses sufficient to draw these waggons through the streets being always kept in readineſs at the landing-place. Under this arrangement too, upon the plan of universal rail-ways, as you have suggested, it would be a great convenience to find that the same waggons that were required for other purposes in the country could be equally well adapted to go upon the rail-ways, when neceſsary, without any other alteration than that of merely putting on or taking off the shafts, as circumstances should require.

If you approve of this hint, please to insert it in

your useful work, with your first conveniency, which will oblige your constant reader,

BULSTRODE.

P. S. I shall fill up the remaining part of this sheet of paper with a few remarks that occurred to me on the visit that I paid to Matlock when in that neighbourhood.

I presume that few of your readers need to be informed of the romantic situation of that charming village. This has been so often noticed in the various topographical accounts of England and its beauties, as to be very generally known. On that head, then, I shall only give my hearty assent to the praises that have been bestowed upon it by every person who has visited it in the summer season. Indeed, whoever could contemplate the grand and striking beauties of that bewitching place without feeling an impression like enchantment, must have a soul utterly incapable of relishing the beauties of nature. It is not, however, as an object of taste, but under a philosophical point of view, that I mean here to consider it.

The stupendous grandeur of its rocks were not more attractive to me than the unparalelled health and vigour of its trees, and the luxuriance of every plant and weed that sprung up in such profusion in every part of that valley. The wall-flowers were in full bloom, and more resembled high bushes of broom, at a little distance, than any thing else to which I could compare them; and almost every other plant assumed a similar appearance of health and vigour. This extreme luxuriance of vegetation could not fail to draw

the attention towards an investigation into the cause of it. I examined the soil, and could find nothing peculiar in it, except the quantity of calcareous matter that it contained. To that may, perhaps, be added the strong calcareous impregnation of the waters that percolate that soil pretty generally. The rocks in that neighbourhood are entirely calcareous; but those that have been long exposed to the air, and raise their towering tops so high, are hard, and differ so little from many other kinds of lime-stone, that I could not attribute the fertility of the soil to the mouldering of these rocks. On digging into the soil, however, another kind of calcareous stone is every where met with, whose singularity of appearance must strike every stranger as an uncommon production of nature. It is extremely porous, and, when fresh opened, is soft to the touch, of a dark brown earthy colour, and admits of being then easily cut with any edged tool, or crumbled down to powder. If it be cut into blocks of any determinate size and shape, and allowed to dry in the air, it becomes whitish, and extremely firm; and, as it binds with lime cement more firmly than any other kind of stone, it affords a very proper material for building; being light, firm, and extremely durable. This substance they call *marle*; and it is apparently the *detritus* (moulderings) of this matter which constitutes that part of the soil to which it owes its extreme fertility.

When I examined this kind of stone as it was fresh dug up, it appeared so open and porous, and assumed such a diversity of forms, that I was at first at some loss for its origin; but it did not require much atten-

tion to be able to trace it through its various modifications.

There is a petrifying well in the village, which most strangers go to see, and which no visitor ought to omit inquiring for. There you are let into the whole secret of the formation of this stone, under all the infinitely diversified forms that it aſsumes; for all the waters there seem to be more or leſs of the same nature with this well (a beautiful specimen of the petrifying quality of the water of the tepid bath being exhibited in a little enclosure between the road and the river, below the bath, where the conduit leading from it comes above ground). Whatever substance, whether animal, mineral, or foſsile, is immersed in this water, becomes in a short time covered with an incrustation of this soft greyish calcareous matter, which invariably aſsumes a firm texture as it dries. A petrified wig is one of the articles there shown, the hairs of which have been each of them incrusted as other substances are. This incrustation becomes thicker the longer it is suffered to remain; so that two hairs that were at first separate from each other soon come to touch; and by and bye they unite into one. The small maſses become then a solid matter, and only the larger ringlets are detached: the larger, in time, would touch at their extremities, leaving cavities in the heart, and so on.

All the substances moistened by this water become thus incrustated; so that the stone thus formed must of neceſsity aſsume a diversity of forms, not only on account of the shape of the substances, but according to the length of time they have been suffered to remain

in the water. A tuft of fog, or a stalk of grafs, for example, after lying a short time, exhibits the perfect resemblance that the mofs or grafs bore before it was immersed; but, as the incrustation is in this case thin, it is soft and brittle, and easily destroyed. If they be suffered to remain longer, the forms of the tender filaments are lost, and it becomes a stone, bearing only a resemblance to the general form of the mafs, without any appearance of the minute traits.

If a bundle of sticks be left in the water, these also become incrusted, and exhibit at first the perfect appearance of every stick in stone; if they lie longer, this also becomes a solid mafs, which increases in size, in proportion to the length of time it remains; so that this bundle of sticks may become the nucleus of a large rock in time. The wood of these sticks, however, gradually decays, the stone that formed the original coating preserving its form; so that when you come, after the lapse perhaps of ages, to cut up the rock, you find hollows where the sticks were, in all the irregularity of form that they first bore. If a parcel of rubbish, consisting of ashes, stones, earth, bones, or any other materials, be pervaded by the same water, these also become incrusted with the same calcareous matter, thus forming separate nuclei of so many stones.

Such, sir, I have no doubt, is the origin of that porous rock which is found under the surface every where about Matlock, which is always soft and tender while moist, and which of course, when it is crumbled to pieces in that state, forms a kind of soil consisting chiefly of calcareous matter mixed with the native soil

of the country, which appears to me to have been chiefly of an argillaceous manure; and this mixture poſseſses a degree of fertility more favourable to the growth of most of the plants usually cultivated by man than, perhaps, any other that can be mentioned.

I do not know, sir, whether you will agree with me in thinking that the extreme fertility is owing entirely to the calcareous matter; more especially when we consider that chalky soils, which seem to consist nearly of the same materials, are by no means remarkable for that valuable quality. Perhaps my notions on that head may not be well founded; but, as an investigation of them may, probably, lead to something useful, I shall, with your permiſsion, freely state what occurs to me on that head, for your correction, and that of your judicious readers. I give these conjectures not as rules, but as mere positions to be farther examined.

The calcareous matter in chalky soils seems either to be pure, or intimately blended with clay; and, as this mixture seems to have been formed when the calcareous matter was in its perfectly *mild* state, it never can be brought into the hardened state of a stone; so that, when it is moistened, the chalk does not seem to divide the particles of the clay so as not to prevent it from retaining its qualities of clay still undiminished; so that it always becomes soft and cohesive when moist, and hard and adhesive when dry: thus it retains at all times nearly the whole of the worst of the mechanical qualities of a strong clay, to which are superadded, perhaps, some that it derives from calcareous matter as a chemical combination. On the other hand, in the Derbyshire *marle*, as they call it, the calcareous

matter having been deposited from water in which it had been *chemically* diſsolved, and consequently in its caustic state, it aſsumes a stony consistence as it dries, and cannot of course be any more acted on by water so as to soften it, as in the other case. On the contrary, when mechanically considered, as blended with the clay, it must act as sand, so as to diminish its cohesiveneſs in proportion to the quantity contained in the maſs. Accordingly, nothing of that cohesive slipperineſs is found in the Matlock mould, which is so remarkably characteristic of chalky soils. Although, therefore, it contains perhaps an equal proportion of calcareous matter with some kinds of chalk, it may, and indeed ought to poſseſs qualities extremely different from it in respect to the promoting or retarding the growth of vegetables. Be this as it may, the soil about Matlock is certainly much more favourable to the growth of vegetables in general than any chalky soil that I have ever seen.

I hope you will excuse my freedom in hazarding these conjectures, as they are only intended to lead to a more accurate investigation of this interesting subject.

N. B. If my conjecture be well founded, it would seem to indicate that lime, or lime-stone powdered, applied to clayey soils in very *large proportions*, ought to have a powerful tendency to fertilise the soil; though soft chalk should not produce a like beneficial effect when employed as a manure upon stiff clayey soils. Can you, or any of your readers, state any *well authenticated* facts which would tend either to confirm or confute this supposition?

As to the last part of this question, the Editor cannot speak, having never had an opportunity to make any experiments on the soils above described; but he has seen calcareous soils which consisted almost entirely of shells broken small, with scarcely any admixture of earth. These were called shelly sands, and were remarkable for their extraordinary fertility. This fact seems to confirm, in as far as it goes, the hypothesis of this ingenious correspondent, to whom many thanks are returned for his favour.

ON HOT WALLS, &c.

To the Editor of Recreations in Agriculture, &c.

SIR, June 17, 1801.

REMARKS and inquiries on useful subjects often call forth instructive explanations and valuable information; from an idea that those which I am about to make may induce communications from you, or some of your well-informed correspondents, which will be acceptable and serviceable to many others of your readers, as well to myself, I beg leave to trouble you with them; and I feel encouraged to do so from the obliging attention with which you favoured a letter from me some time ago, on the construction of a hot wall, &c. for which I embrace with pleasure this opportunity of returning you my best thanks. I ought, by the bye, to have informed you on that occasion, that coal-slack, which serves very well for heating walls, is so plentiful and cheap in the neighbourhood where I reside, as to render the expence of it for that purpose of very trifling considera-

tion; and the flues, instead of being wide enough to admit a boy, as you say, to sweep them, in all the walls I am acquainted with, are only about eight inches wide; and (bricks being left loose, to be taken out in the back) are swept by drawing a holly bush through them with a rope, so that the whole thickneſs of the wall need scarcely be two feet.

Your readers, and indeed the public, are much indebted to you for your observations respecting the culture of potatoes. I write to you from the western part of Lancashire, where, I presume, the cultivation of them is more generally attended to, and better understood than in any other part of the kingdom; but it is unfortunately an undisputed opinion, that the same variety of the potatoe, to produce good crops, must not be cultivated more than one or two years at most on the same *kind* of soil; and in consequence, no farmer continues longer to obtain *sets* from potatoes of *his own growth*; and therefore no such attentions as those which you so judiciously recommend are ever paid to them; nor is it probable they will be, so long as such an opinion prevails. The method, however, of cultivating potatoes on wheat fallows, recommended by Mr. Cotes to the Board of Agriculture (his letters on the subject having been published by the Board, I presume you have seen them) is, and, I believe, has long been, generally practised; but, although it is without doubt beneficial, the wheat which follows is always thought to be the worse for it; whether from being sown later, or from the dung which the potatoes were neceſsarily set in, or that these are an exhausting crop, is well worthy inquiry.

The neceſsity of using so considerable a quantity of dung in setting potatoes, prevents very much a more general and extensive cultivation of them; as a proof of this, and that the premiums offered by the Board of Agriculture are unneceſsary, I have known quantities of dung bought for the purpose at sixteen shillings per ton; to be carted almost twenty miles afterwards by the purchasers. If the season prove favourable, there is no doubt potatoes will be very plentiful next winter.

No farmer in this part of the world would think of storing potatoes in his barn, if he could conveniently do so; *pying* them in the fields where they are grown, which is invariably done, is very little more expensive. It is surely not so chargeable as you seem to apprehend; and it is looked upon as the only safe means of preserving them from frost, which in a barn cannot certainly and easily be done; but they may thus be safely kept, without *spritting*, and in the greatest perfection, until the end of March, when it is surely time to dispose of them to the dealer or consumer, which may here be done without difficulty.

In specifying the qualities which the potatoes ought to have for the best cultivation, of which you propose the offer of premiums, it seems to me that you have been unmindful of a very eſsential one, the quality of *keeping long*, sound, and palatable. Many kinds of potatoes are very good, perhaps better than all others, before Christmas, which afterwards become extremely unpalatable, and scarcely eatable; indeed this is the case with most, if not all, early kinds. I never heard of any that were good both very early and very late;

and it may be doubted, I think, whether all the desirable qualities will ever be procured from the same root.

In recommending different kinds of succulent food for cows in winter, Vol. III. page 243, you omit this excellent vegetable, which I cannot think you did intentionally, as there is, perhaps, no other which they feed, or milk better with, even unboiled. Potatoes communicate no disagreeable flavour to the milk; and they may be safely stored until spring, when such food is most wanted; and when, after severe winters, most other vegetables have perished.

When cows are well fed, you say, Vol. III. page 248, they ought to be milked more frequently than twice a day; that the quantity of milk would, for a time, be considerably increased by more frequent milking, there seems to be no reason to doubt; but would the cows, howsoever well they might be fed, be long able to bear it? Nature will not endure continual exertion; and cows, which give more than usual quantities of milk twice a day only, often appear very thin with plenty of the best food. Do the good women in Scotland, whom you mention to derive benefit from such a practice, invariably milk their cows three times a day so long as they continue to give milk, or only during the season for making cheese, &c.

> " Infelix semper oves pecus .....
> " Hic alienus oves custos bis mulget in hora;
> " *Et succus pecori*, et lac subducitur agnis."

In the extracts you have made from Tarello's treatise, Vol. IV. page 411, clover is recommended as an ameliorating crop; but is not red clover the most *impoverishing* crop in a stiff soil that can be cultivated?

Almost all books on farming contain directions for making hay; but in those I have met with, they relate only to clover, &c. and not to meadow grafs. I should be much obliged if you, or any one of your correspondents, would afford me some information on this subject; especially such as may be useful in unfavourable weather; and how far the grafs ought to be permitted to ripen before it is mown. When grafs is suffered to grow until it has *ripened* considerably, does it not, besides making more juicelefs hay, exhaust the soil, and the grafs roots too, much more than it would do if cut earlier? It is commonly said amongst the country folks, "if you mow early, your meadow will *expect* early the year following." Is there not some truth in this? And may not early mowing prevent in a great degree the meadow from being impoverished? I am, sir, very respectfully, your most obedient servant,

TYRO.

What author would best instruct a very young botanist, and enable him to make himself acquainted with, and to arrange the different grafses, and also the herbs which are usually found in meadows, &c.?

Remarks and explanations on the same subject, by the Editor.

Few things can afford more satisfaction to me than to find subjects of general utility investigated with freedom by my different correspondents, especially when their observations are founded on practice and experience; and I beg leave to return my best thanks to this ingenious correspondent for his obliging commu-

cation. To promote his object, I shall readily add such hints as naturally arise upon the subjects agitated above.

Nothing has so much retarded the progress of agriculture in all its branches as the tendency that practical men have to mistake *opinions* for facts: nor is there any object that I have more uninterruptedly laboured at during the course of a long life, than to convince the public, if I were able, of this momentous truth. Men have been told by those with whom they converse, that a thing is so or so; and the truth of this position is admitted without any proof, and acted upon ever afterwards as if it were an undeniable axiom, even in spite of facts that stare them in the face every day of their lives, without ever once being adverted to. It is truly surprising to see with what pertinacity the bulk of mankind adhere to such opinions, and how difficult it is to bring them even to consider them for one moment. It has been my fortune to struggle hard in favour of truth against the influence of such opinions; and although, in most cases, I cannot boast of the success that has attended these exertions, yet I have had the good fortune to succeed in a few instances; and more, it is hoped, may be taken into consideration at some future period of time.

Most of these opinions rest upon a foundation which, though it be just when partially considered, is extremely erroneous when applied universally as a rule of action; and the main difficulty is, to make men advert to the circumstances which lead to the error. The influence of *breed* upon the sensible qualities of animals has, for example, been controverted,

and finally denied by most men, because it has been often observed, that the progeny of the female inherited qualities extremely different from those of the mother; and its having been observed, that a small number of beasts of one sort, being introduced into another country, where a numerous race of another breed are reared, the descendants of the last are quickly seen to degenerate, so that in a short time they are no longer to be recognised from the native breed,—has been conceived to afford demonstrative evidence that soil, climate, and other circumstances, have an undeniable power to alter the nature of animals in a variety of ways. They did not consider that the effects observed must be inevitably produced by the unavoidable intermixture of breeds under these circumstances; nor has it been without great difficulty that the public have been induced to advert to this last circumstance, even where the facts in proof of it have afforded the most incontrovertible evidence of its truth.

The *opinion*, that English sheep when taken to Jamaica carry no wool, but hair only,—and that in a short time they are converted, by the influence of the climate, into a creature poſseſsing qualities of a very different sort, has obtained such a firm footing, and has been so long admitted by every person in those regions as an undoubted fact, that there is not, perhaps, one person in a thousand that has lived many years in that island, who would have the smallest hesitation, it is believed, to take his *bible oath* to the truth of it, if required. *Opinions* of the same sort have too often been deposed to as *facts* at the bar of the house of commons; and thus have the legislators

been led, on many occasions, to enact laws that have had a very pernicious influence on the community; for it unfortunately happens, that when men have once adopted such opinions, they adhere to them with a pertinacity greater than to the truth itself. Ought it not, then, to be the province of the *speaker* to check the evidence in these cases, as it is that of the judge in courts of law to prevent any witneſs from substituting *opinions* for matters of fact. Should the respectable character who now holds that office introduce such a practice into the house of commons, he would confer an eſsential benefit on the community, and render his own name immortal.

Is there not reason to suspect, that the *opinion* that the same kind of potatoe cannot be cultivated with advantage in Lancashire above one or two years, has been admitted without that sort of evidence which a thing of that nature would require? I have certainly known the same kind of potatoe cultivated on the same farm, not only for one or two, but perhaps ten or twenty years, without observing any perceptible diminution either in the produce or the quality of such potatoes. This, I confeſs, was more frequently the case in former times than at the present day; although, even of late, this has been commonly done in some remote parts of the country. That the kinds should now degenerate in a short time, I can see very good reasons for supposing will be the case, whether they be cultivated on the same soil or others: for, as the new kinds of potatoes are now all obtained from seeds, and as these are seldom, or never, propagated from *one single* parent plant only, it neceſsarily follows that they

must all be of a mixt sort, some of which will, in general, be more productive than others; so that the proportions of the different sorts must ever vary. I feel inclined, therefore, to place this opinion of the Lancashire farmers in the unfounded clafs, which, though under certain circumstances it may be just, yet, considered as a general position, must be fundamentally wrong.

I agree with my respectable correspondent in thinking, that the *opinion* concerning the baneful influence of potatoes as a preparation for a crop of wheat, requires a much more careful investigation than it has yet obtained, before it be admitted as a fact. I know many hundreds of good farmers who consider a potatoe crop as a better preparation for a crop of wheat, when *properly* cultivated, than a pure fallow ever is. In many places the potatoe is considered as one of the most ameliorating crops that can be reared, while in others it is accounted of an exhausting nature. I will not, myself, enter upon the question of the ameliorating or exhausting nature of crops, because it would require a nicety of disquisition that few persons at the present time would be inclined to pursue; I have only to say, that, when it shall be investigated, perhaps the whole of the current doctrines on that subject will be found to be merely *opinions* that have been adopted from a partial view of the facts inquired into. Some persons maintain, that a crop of broad clover is, upon a clayey soil, perhaps the most ameliorating crop that can be reared, while my correspondent is evidently of a contrary opinion. Perhaps both opinions are equally well or ill founded: at any rate, however, this cannot affect

honest Tarello, whose system of agriculture was evidently suited to a rich soil only.

I suspect that my correspondent has never made a fair calculation of the expence of *pying* (as it is styled) potatoes in the field, including the risk. What people in the country have been accustomed to do they think lightly of; but assuredly one permanent roof, if it is to be sufficient, will be much less expensive in a number of years than many, and those perhaps of a hundred times the extent. If the walls of a barn be lined on the inside with a moderate coating of straw, and covered with the same above, no frost that ever takes place in this country will affect the potatoe.

The quality of long keeping of the potatoe was not overlooked by me; but it was not judged expedient to introduce this characteristic in the first trial. That, with many other useful peculiarities, was reserved for future investigation.

Neither was the potatoe overlooked as a succulent food for cattle, as he will find by recurring to p. 169. But, for the reasons there given, it was not deemed likely ever to become so extensively useful as many other sorts of food.

The quality of potatoes keeping good late in the season seems to have no necessary connexion with that of their being indifferent at the beginning of the season. I had potatoes that were fit for use in July last, and continued good throughout the whole year till the beginning of the present month of June, when they were all used. I see no reason to think that any two or more qualities of potatoes are necessarily connected or disjoined from each other; so that, by a pro-

per attention long enough continued, it is impoſsible to say what improvements may be made.

Cows are usually milked three times a day over the greatest part of Scotland, from the time of calving till the milk begins to dry up during the winter season, when the cows are for the most part in calf; nor is it found that they suffer by that practice in any degree: and it is the general opinion of all who adopt it, that nearly one third more milk is thus obtained than if they were milked only twice. There are individual cows which can with great difficulty ever be brought into flesh, milk them as you will; and there are others which keep always in high condition, though they yield a great quantity of very rich milk. The cow, mentioned Vol. III. p. 95, was milked three times a day for ten years running, during the space of nine months at least every year, and was never seen, during all that time, but in very excellent order, though she had no other feeding than was given to the rest of the cows, some of which were very low every winter, when they gave no milk at all. Things of this sort ought not to be judged of by reasoning alone, but by careful experiment and accurate observation. The quotation does by no means apply to a judicious milking of the cows.

In the third volume of "Eſsays relating to Agriculture and Rural Affairs," eſsay 3d, Tyro will meet with some hints respecting the cutting of graſs and making of hay, which will perhaps afford him satisfaction relative to the particular about which he inquires. It is much to be regretted, that the mode

of making hay there recommended has never yet been practised on a *large* scale. It has been found fully to answer the most sanguine expectations of the proposer in small trials; the only way in which he has had it in his power to practise it. There is reason to believe that it will be carried into practice more extensively next season.

Were fuel ever so plenty, it is very plain (for the reasons afsigned p. 118.) that *hot* walls never can be employed, either with economy or pleasure, for the purpose of forwarding fruits. The heated air must be carried upwards so quickly as to extend only for a very short distance from the wall at any time (but particularly so in the spring before the leaves be out); so that if that wall be very much heated, a single leaf may be scorched to a cinder on one side, while it is chilled on the other; and the fire is no sooner abated than a chilling cold must prevail in every part.

To the Editor of Recreations in Agriculture, &c.

DEAR SIR,

In the second Number of your Recreations, you have favoured us with some concise remarks upon the nature of mofs, and the detriment which it does to apple-trees if suffered to remain unmolested. To the justice of these remarks in general, I readily accede; though I do not think that you have made sufficient allowance for situation. It is well known that one side of a tree (and that too through a whole forest) may be entirely covered with mofs, while the other side is entirely free from it; and I have observed, that those apple-trees which are planted

in swampy ground, with little acceſs to the sun, are most subject to the influence of this destructive weed. The county of Devon, sir, is, from its vicinity to the sea, much exposed to moisture; and in the neighbourhood of Exeter, where the soil, particularly to the west, is for the most part, of a thick, strong clay, and frequently full of springs, the moisture is often very abundant. Hence I imagine it is, that the orchards in this district are, generally speaking, almost eaten up by moſs, the trees being thus (to use your own expression) "in a state to promote its vegetation." I am sensible, sir, that there are some few scattered instances of farmers and others, who have considerably improved their orchards by under-draining the ground, opening the trenches, and washing the stem of the trees, and more particularly by enriching the soil; and when these precautions are taken, I acknowledge the greatest beneſit to arise from them; but the farms being frequently small, the occupiers are poor, labour is scarce, and manure dear; the cold nature too of the clay, added to a superabundance of moisture, not only prevents the roots of the trees from spreading, but enfeebles, if not destroys, their powers of vegetation. In order to satisfy myself more fully upon this subject, I ordered two apple-trees, that were wholly covered with moſs, and planted in a swampy part of an orchard, to be rooted up. Upon examination, I found their lower roots, which had been long buried in the cold wet clay, to be completely decayed; and their upper roots, which had run out to a considerable length through the thin stratum of vegetable soil, had rendered but a feeble support to the

trees. This experiment induced me to alter my method of planting, and to this determination I was still further induced by observing, that several of my young trees, which had been planted in the usual manner, had died before the end of the ensuing year. Instead then, sir, of digging a pit, which is the common practice, I next planted my trees upon the surface of the ground, in the following manner. Having first marked out a certain space, about eight or nine feet diameter, I turned it up with a spade; upon the surface of this spot I placed my tree, and then threw upon the earth as much of the loose surrounding earth, mixing occasionally some manure, as was deemed sufficient to secure it effectually against winds. A tree thus planted, appears as if it were set upon a hillock, and it undoubtedly consumes more of the vegetable earth than the usual method, but the advantages derived from it in a clayey soil, appear to me to be numerous. It is true that my experience of this practice is not of long duration, since I began to plant thus only two years ago; but though the last year produced me one of the wettest seasons ever known, yet none of my trees died; the rain being entirely thrown off by the cone of earth at the roots. Another effect of this cone is, that by gradually sinking, (in which perhaps it is aſsisted by the rain) it closes round the stem of the tree, and thus very considerably diminishes the influence of the winds upon it. The roots of the tree being placed at a distance from the clay, receive more nutiment, and of course the vegetative powers of the tree itself will be increased; and this I trust will render it leſs liable to be infected by moſs.

With respect to the time of planting apple-trees, autumn appears to me to be preferable to the spring, because the roots then vegetate, and if a tree can endure the winter, there is less fear of its surviving altogether; whereas trees planted in the spring are frequently known to die in the ensuing winter. I remain, my dear sir, your most obedient, T. N.

I have met with few improvements in agriculture more judiciously conceived than the above; and I hope the hint will be attended to by all who read it, and who ever intend to plant trees in a clayey soil. Nothing certainly can be so absurd as to dig a pit in a clayey soil for the purpose of planting the roots of a tree in it, and then filling it up with mellow mould. The pit, were no earth to be put into it, would be quickly filled with water, which would there remain until it were dried up by the sun; for in such a soil, water can no more percolate through it, than it could penetrate a pot of burned clay which had no hole in it. Loose vegetable mould, when put into the pit, only becomes, when it is moistened with water, a soft mash like gruel, so that the roots which are placed in it must be perpetually drenched in water for many months together; which cannot fail to bring diseases upon the tree, that after making it languish, and finally perish from the superabundant moisture in all its pores, affords a proper nidus for moss to grow in, which it is well known delights in cold and moisture beyond any other plant that grows; and wherever this parasitical plant grows, like an animal covered with vermin, it never can continue in health, or long to exist.

By the mode above proposed much of this evil will be avoided. The best, and the most absorbent part of the mould, is accumulated round the roots, which are placed in such a situation that they never can be drenched in moisture, and will therefore continue long in health. In addition to the directions here given, however, I would beg leave to suggest the propriety of digging or ploughing, or otherwise loosening the whole of the mould between the trees, keeping it in culture for some years, manuring it completely, in the mean while, with a very abundant dreſsing of lime, where it can be had, along with other manures, so as to bring it into a mellow state that would be pervious to moisture; and in this rich condition laying it down to graſs; taking particular care never to suffer a beast of any kind to set a foot upon it in wet weather; for this must tend to knead it, and form holes that neceſsarily hold water to a certain degree, and in so far counteract the effects of the dreſsing. In this way an orchard may be made to prosper abundantly, where it must otherwise have been in a perpetually languishing state. But it ought never to be forgotten, that the apple is uot the fruit-tree that thrives best in a strong soil. The pear-tree is much better calculated to form a prosperous orchard on clayey soils; some kinds of which, the *rough cap* pear in particular, can only be made to thrive on such a soil; and on such a soil it forms a most superb tree, whose beauty as well as fertility, can be equalled by very few trees in this country.

The following was transmitted to me as a curious instance of the mistakes committed by the Italian servants at Rome.

BEFORE you arrive at the apartment where the company is aſsembled, you paſs through several antichambers full of servants, whose dreſs, functions, and titles, are different from each other. Your name is repeated from antichamber to antichamber, and when it happens to be that of a foreigner, it is sometimes strangely disfigured. I have heard that upon Monsieur de Montesquieu paying a visit to a Roman prince, he was first announced as Monsieur de Mondedieu, after that as Monsieur de Montieu, and in the third apartment Montieu was changed to Mordieu; at last, for its finishing metamorphosis, he became Monsieur de Forbu.

Doctor Tiſsot's name is universally known. Cardinal de Bernis amused himself in telling me, that when he called upon him, the first servant announced him as Doctor Tiſson, the second Toſson, the third Tosodi, and at last he was introduced by the fourth under the name of the Doctor Toſsoni.

I related to the Cardinal what had happened to this eminent physician at Geneva. It was a most striking contrast. Tiſsot, on paying a visit, told the servant girl his name, and begged of her not to forget it; "You take me then for a fool," replied the girl, "in thinking I am capable of forgetting so celebrated a name."

Many other examples might be adduced of the blunders of English names in particular, by both Ita-

lians and French. An old friend of mine, whose name was Dashwood, was called at Orleans Le Chevalier de la Chouette. And the present lord Dundas was announced in Italy under the name of Tontaſso.

Reading Memorandums.

" He had as good a title to the inward light, which always comes through a crack in the skull, as the methodists have to religion."

" The chief fault of our language is, that almost all its words end in consonants. Hence principally its harshneſs. The great secret of writing melodious English is, surely, to draw into view every poſsible word which may terminate in a vowel."

" It is mortifying to every judge of language, who must know that the melody and elegance of a tongue depend altogether upon its vowel terminations, to reflect, that not above a dozen common words end in *a*—for lea, plea, pea, sea, &c. do not sound as if they ended in *a*, but in *e*. In *e* not one word (in sound) ends; nor in *i!* In *o* about 24; in *u* no word whatever, and the Romans had very few. In *ou* we have only two; *thou*, *you*. But in *y* we have no leſs than 4900 words, about an eighth of our language; our words amounting to about 35,000. We have 1683 words ending in *ess*, the most horrid of all terminations "

" Your kind and friendly epistle came in good time; for I want all the consolation and support that friendship can bestow. I have now lost the best, most faithful, and affectionate friend I had in the world, and am left alone a sojourner and a pilgrim in it."

"She died, as she lived, a virtuous, pious, and resigned christian, never murmuring at the severest stroke. She set us an example of true patience and submiſsion; and, without complaint, resigned herself to the will of heaven."

"When the faith of the sincerely good began to fail, and they were ready to fear that the enemies of religion would bear down all before them, then did the Almighty see proper to reveal those momentous and divine prophecies, concerning the appearance and transactions of the Meſsiah, which aſsured the righteous, that Jehovah reigned supreme in the earth, and that he would render his name completely glorious."

"It was a voice from heaven, a voice which originally proceeded from that sacred place where the eternal deity erects his throne in a peculiar manner, and sheds the rays of his presence with peculiar glory."

Index Indicatorius.

In consequence of my absence last month, and other circumstances, I find myself greatly in arrears to my correspondents, whose indulgence I hope to obtain.

A lady who aſsumes the signature *Martha*, is greatly offended that I have not long before this time entered upon the promised critique on the poems of Oſsian, son of Fingal, or Rowley, the poet of Bristol; for she thinks that these poems, which she views with the most partial predilection, have been too long suffered to lie under the opprobrium with which "a par-

tial and unjust criticism has loaded them." I regret that this fair correspondent should have been in any respect disappointed, but circumstances that it would be unnecesary to state, rendered that delay unavoidable. From the manner in which she writes too, it seems to be by no means improbable that her expectations might have been still more disappointed by the critique itself than they have been by its omision. This I should much regret; but when the mind takes a too partial fondnes for any object, some degree of disappointment is generally the result of it. I admire these poems, it is true; but certainly no impartial person can consider them as free from imperfections and defects.

A Saunterer has extended his excursions up the banks of the Thames beyond Putney Bridge, and has favoured me with his remarks on some of the beauties of the country that struck him in that excursion. In his walk from Putney to Barnes, in particular, along the banks of the river, early in a morning, the luxuriance of the trees, and their fine reflexes in the still water, the singing of the birds, &c. he describes with the enthusiasm natural to a young mind to which such scenes have not been long familiar. One thing only produced a jarring feeling in his mind, which he reprehends with a warmth that cannot be accounted blamable. It was the mode of dragging the barges along against the stream, which he justly considers, in the way it is there conducted, as a most barbarous practice. "I saw," says he, "a large barge dragged against the stream by six horses, all yoked to one line, which was fastened to the top of a low mast placed in

the barge for that purpose. These were driven by an unfeeling monster, who goaded them on by severe smacks of his whip almost inceſsantly repeated, although he saw that the last horse was in danger of being pulled into the water at every step, in spite of his most violent and inceſsant efforts to avoid it; for the barge keeping near the middle of the river, the line was of neceſsity bent by means of that horse almost at right angles, the horses before him pulling right forward by the river side, and he, poor creature, dragged sideways in the most cruel manner, every nerve strained, and all covered in a lather of sweat. Never in my life did I see any thing that appeared to me so barbarous; for the short exertions that are sometimes seen on the streets of London are to this nothing; for these are but momentary; whereas this is an exertion that seems to be continued for the whole length of the journey. Is there no method, he asks, by which such a brutal persecution of a poor brute could be avoided?"

I most sincerely concur with this correspondent in the severity of his reprehension of this practice, which I myself have too often witneſsed, and which never can be thought of without exciting sensations of horror. Could no mode of alleviating the evil be proposed, the practice ought to be altogether prohibited by the legislature of this country as disgraceful, and a perpetual reproach upon the nation to be tolerated. I have been aſsured on the best authority, that so violent is the strain upon the last horse, that many instances have happened where he has been wholly unable to overcome it, and has been dragged into the water, and the others are on such occasions sometimes

dragged after him, so that it is by no means an uncommon thing for the whole team of six horses to be drowned in the river at once. When one horse only is employed to drag a boat, he goes comparatively at his ease, because he can proportion his own draught forward to his power of resisting the lateral preſsure; but such is not the case where many horses are yoked to one line. Why not then cause a separate line to be paſsed from the veſsel to each horse? In that case their exertions might be made nearly equal, and the strains, by being divided among the whole, would not become so cruelly oppreſsive to any one.

The favour of *Amicus* is thankfully acknowledged; and it is with great reluctance the Editor finds himself constrained not to comply with the request it contains. When this correspondent reflects coolly on the difficulty it might throw him into with respect to others, it is not doubted but he will see the propriety of this determination.

It is hoped *Viator* will excuse this tardy acknowledgment of his very obliging communication, on account of circumstances which rendered it sooner impracticable. The further correspondence of this gentleman will prove very acceptable.

Letters from *Aldred—Corinna—Duplex—Mitford—A. R. Y.* are acknowledged. Should any others be omitted, they may have been mislaid in the Editor's absence, but will be recovered.

29.

JULY 1801.

RECREATIONS, &c.

N° 5. Second Series, Vol. I.

On the British Constitution.

[*Continued from page* 227, *and concluded.*]

In our former disquisitions on this subject, we have had occasion to take notice of the imperfect state of the constitution of parliament in ancient times in several respects. The same fluctuation and uncertainty will be observed to have prevailed in regard to all the other functions of that assembly, though it would be tiresome to go through all the particular heads. I shall conclude this essay with a few remarks on some other particulars.

THE MANNER OF ENACTING LAWS.

It has been formerly observed, that under the reign of the first princes of the Norman line, the principal business for which parliaments were usually called, was to grant supplies to the king; and that the prevailing idea was, that each division of the people was a distinct class by itself. The nobility and clergy at first, and afterwards the clergy, lords, knights, and bur-

geſses, and that each of these granted, for their own order only, such subsidy as they thought proper.

An idea, somewhat of the same kind, seemed to prevail with respect to legislation, after the parliament began to have some notion of its powers as a legislative aſsembly; and it was long before they got a glimpse of that lucid order which now prevails in regard to the enacting of laws. Those who have not turned their attention to this subject, but who have formed their notions of parliamentary conduct from the established mode of procedure at the present time, will find some difficulty in believing it poſsible that they could ever have proceeded in such a loose and inaccurate manner, as they certainly did, in a matter of so much consequence.

In the days of the conqueror, and his son William, royal edicts, as in other kingdoms in Europe, constituted the bulk of the political regulations in force. The weak title that Henry the First, and some of his succeſsors, had to the crown of England, induced them to court popularity, so as to make any petitions that parliament offered for redreſs of grievances to be listened to. The king was, at that time, supposed to have the power of making laws, but the people were thus encouraged to petition for a redreſs of grievances; and, as it were, modestly to hint at such laws as they wished should be made. It thus came to be customary for those who were called upon to grant supplies, to present, at the same time, their humble supplications that the king would redreſs such grievances as oppreſsed them.

These petitions, judge Hale remarks, were granted

or refused without ceremony or hesitation.* Those petitions that were granted were afterwards put into the form of statutes by the judges and other members of the king's council, inserted in the statute book, and transmitted to the sheriffs for promulgation,[a] together with such other regulations as they thought proper to devise.

It thus clearly appears, that about the period to which we here allude parliament had not even an idea of their right to enact laws. The utmost privilege they laid claim to in this respect was that which is now exercised by the Lord Mayor of London, and other communities of the kingdom, humbly to petition his majesty to adopt such a conduct in his legislative capacity as would prove agreeable to them, which they did not consider as in any way obligatory upon him. The edicts of the king of England were at that time issued nearly in the same manner as they then were in other countries of Europe, and still are in many of them. His *fiat* was considered as a law, and obligatory on all the subjects in every instance, unless in as far as it respected the levying of money upon the subjects, in regard to which article, unless in as far as respected the marrying of the king's daughter, &c. it was always contended for by the subjects that he had no right to interfere. Fortunately, therefore, we may say for the liberties of Britain, it so happened that *our* kings, in consequence of their absurd claims on France and

* An instance of such refusal occurs anno 1377, when the whole states in parliament petitioned, that no burdens be henceforth laid on the people but by consent of parliament, *refused.* Parl. Hist. v. i. p. 328.

[a] Hale's Hist. cap. L. p. 14.

other nations, were more frequently in want of money for effecting purposes in which the national vanity was concerned, than most other potentates; in consequence of which they more frequently found plausible pleas for inducing the people *voluntarily* to grant supplies than most others could devise. Hence it happened that the monarchs found an interest in frequently calling parliaments, with a view to induce the people to comply with the royal will in that respect; and hence also it so frequently happened to be the interests of the prince to comply with the wishes of the people. Thus the people and the prince came mutually to relax a little in what each of them considered to be their fundamental privileges, till at last the system of political economy, which we now so much admire under the name of the *British constitution*, by slow degrees, and after a series of amicable struggles, which, like domestic contests, sometimes seemed to threaten destruction to the whole of the parties concerned, acquired a consistency that none of the parties contemplated during the progress of its maturation. Various were the devices that each of the parties adopted for obtaining a decided superiority over the other; but still afraid that they might ultimately fail in establishing a *right* to what they were conscious was merely an encroachment, they proceeded with a circumspection that dreaded danger alone could ever have induced. And as each party was continually on the catch to avail itself of every favourable conjuncture that occurred, sometimes one advanced, and then another; so that every point was considered and reconsidered with a degree of attention that never could have otherwise been com-

manded. The history of this struggle and its consequences, if ever it shall be given by one who is qualified for the task, will form one of the finest political treatises that ever was written. But this, I fear, is what we may rather *wish* than *hope* to see accomplished. In the present case I can only attempt to suggest a few hints, merely to lead the mind into the track it ought to follow in such an investigation.

The conduct of man, in every state of society, is regulated by what appears to be his interest at the time, and this must ever depend upon the nature of the incidents that occur, and the feelings these excite at the moment. In vain do we attempt to trace the present state of things at any period to the effects of design and foresight at any distant period. They are merely the result of accident; and the exercise that these accidents give to the reasoning faculty of man. The political course, therefore, of the body politic may be compared to the track of a butterfly in the sky; at one moment he points his course, seemingly with the most direct impetuosity, towards a particular object, and the next he runs with seemingly equal celerity towards another. Thus is he toſsed from side to side, so that it is impoſsible to say where he will be at any given future period of time. All we can do is to fix the track after it has been gone through; and the traces of it are often in the one case, as well as the other, so slight, as to be with great difficulty recognised. In the instance that now attracts our attention, it is not difficult to perceive that the sacred right of individual property is the only clew that can lead us through this labyrinth. These conquerors of kingdoms individually, after they

had divided their prey, said each in his own mind, this is the portion that I have received, and this no man has a right to take from me. This I will defend against all human powers as long as life exists. The king has his own property, which he may use for his own purposes at pleasure. The great leaders have each their property; and this that I hold, whatever it is, is mine also, and nobody shall wrest it out of my hand. If a public enemy attempts to despoil me, I will willingly join my power to that of others to repel the attack. If an individual attempts it, I will in like manner repel the attack; I have a right to do so, not only by the vigour of my own arm, but by the aid also of all whom I can bring to unite in the same cause.

Such were evidently the prevailing ideas in the minds of our forefathers when they obtained power over those territories we now poſseſs. They relied upon the vigour of their own arm for protection when they did not act contrary to the laws of justice that they had established among themselves. In conformity with this idea, we find that when one of the early monarchs of Scotland, who had been educated in a nation farther advanced in civilization than Scotland was at the time, and of course had adopted some of their notions, demanded that the grandees of his kingdom should produce the charters by which they held their lands, they with one consent drew out their swords from the scabbards, and said, "by these we obtained our lands, and with these we will defend them." This notion of the inviolability of private property had taken such firm poſseſsion of the minds of all owners of land (free-men) in those times, that it could only be effaced by slow and imper-

ceptible degrees. The enacting of laws in other respects they regarded not as a concern of much moment, and therefore saw this power, without jealousy, exercised by those who chose to do it; but, whenever an attempt was made to encroach on private property, alarms were excited, and they stood upon their guard. Hence it became neceſsary for the king, whenever he found himself in want of money, to effect his purposes, to summon those from whom he expected money, in other words, *supplies*, to meet with him, and, by rhetoric and persuasion, endeavour to induce them to comply with his wishes. We have seen above, that the king conferred at one time with the nobles apart by themselves, and with the prelates by themselves, and so on, to try to induce each to give as high an aid as poſsible; and accordingly we find that the practice was invariable for many ages for each separate order of people to grant a different proportion of supply, the clergy and nobility perhaps one tenth, the knights a fifteenth, and the burgeſses such other proportion as they could be induced to give.

So tenacious were the nobility, and all other orders of the community to maintain this privilege; and so averse was the king to rouse the nation on that head, though at the same time so intent to obtain it by indirect means, that the history of Britain from the Norman conquest till the revolution, is little else than a record of uninterrupted struggles on that head. The king, by indirect means, in consequence of the right to legislate that he had acquired, before the people were aware of the consequences that might result from that conceded right, was constantly imposing regu-

lations that trenched in a silent and almost imperceptible manner upon this privilege; and the nobles contending against them: accordingly we find that the *Magna Charta* and *Charta de Foresta*, which the kings, when under depressed circumstances, were compelled to grant, contain little else than restrictions on the king, in this respect, and promises, on his part, to abstain from making such exactions; promises which were evidently made only for the purpose of temporising, and which were forgotten as soon as circumstances rendered it practicable on his part. Those only who have studied the history of Britain under this point of view, can form an idea of the infinity of devices that were adopted with this intention, and the shifts that were practised for concealing them; so that the language of laws, edicts, and regulations, is in direct opposition in appearance from their real purport and tendency. To a superficial reader, therefore, who considers laws as undeniable evidence of the state of facts, if an historian chooses to represent it in that light, nothing can be more deceptious than the idea he would form of the actual state of the nation.

It was the remarking of these particulars, however, by sensible men, which at length produced a conviction in their minds of the importance of parliament being invested with legislative powers, thus silently to check at their beginning enormities which experience had taught them never could otherwise be repressed; and thus was laid the foundation of that claim to parliamentary privileges, which has by gradual steps been matured into that goodly system which we so justly reverence. The attention of the people was at all times

so steadily directed towards this point, that sensible men, wishing to establish useful regulations as they chanced to arise in the succeſsion of time, were enabled, through the weakneſs of princes, occasionally to establish privileges which checked the exercise of arbitrary power, and at last produced the revolution; at which period only those privileges obtained a sanction by law which, however beneficial they have proved to us, could only be considered by the king as encroachments on his prerogative, if the undisputed exercise of powers at former periods can be said to constitute prerogative. It was by claiming, as a *right*, those privileges only which had been undeniably exercised at former times, that the unhappy family of Stuart lost the throne; and those who found a claim to any privileges respecting government upon any other plea than that which the present state of things has pointed out as expedient to the general sense of the thinking part of the nation, will find themselves equally mistaken in their claims; for it will be easy to show that nothing can be more unfounded than to rest our claim to those privileges which we now so justly cherish, upon the practice of our forefathers in regard to these particulars. Thus we have seen above, that so regardleſs were the commons of their privileges as legislators, and so diffident of their abilities in this capacity, that they repeatedly declined to offer any advice, unleſs they were aſsisted with some bishops, or lords. As a farther instance of the ideas they entertained on this head, particularly respecting the burdensome nature of giving attendance in parliament, it is worthy of notice that, anno 1258, twelve men were

chosen by the whole realm to attend parliament, and to transact the public business. This was done "to *spare the cost or charges to the community*;"[b] and in the year 1398 the commons presented a petition to the king in the house of lords, purporting, "that whereas they had before them divers petitions, as well for special persons and others, not read and answered, and also many other matters, and things that had been moved in presence of the king, which, for shortness of time, could not be determined, that it would please his majesty to commit full power to certain lords, and others, to examine, answer, and dispatch the petitions, matters, and things above said, and all dependencies thereon."[c] So little were they attentive in those days to the forms of legislation now used, that the parliament of Westminster, 18 Edward I, on the first day of June, consisted of *prelates*, *earls*, *barons*, and other *nobles*. On the 14th, the king sent letters, desiring the sheriffs to cause two or three of the most discreet knights to be chosen, and sent to parliament, three weeks after midsummer; but no burgesses.[d]—Whilst these elections were making, the parliament continued sitting; and the statutes of Westminster were then enacted. So little, indeed, did they then know the importance of the legislative power, that, anno 1371, a small committee, named by the king, alter at pleasure an act of parliament.[e]

I am afraid that these disquisitions will prove little interesting to many of my readers; yet it ought not to be deemed incurious to trace the progress of human

[b] Parl. Hist. v. i. p. 63. [c] Ib. p. 492. [d] Brady Int. p. 129.
[e] Parl. Hist. v. i. p. 308.

ideas in a matter of so much importance as that which now engages our attention. I shall only, however, venture briefly to specify a few miscellaneous circumstances respecting parliaments before I put a final close to this disertation.

Miscellaneous Remarks.

ERRORS ARISING FROM PERMANENT NAMES TO VARYING OBJECTS.

1st. It cannot be too often repeated, that many mistakes arise from annexing ideas to words that they now bear, when we look back to distant periods, when they were used with a very different signification. The word *parliament*, for example, wherever it occurs, seems, to a hasty observer, always to denote an assembly, consisting of the same constituent members, and subjected to the like regulations as our parliament is at present: but nothing can be more erroneous than this mode of judging. At the period when assemblies of this nature began, a parliament probably was a tumultuary meeting of all the free men in the state, which was subjected to no rules but such as the circumstances at the time suggested. This word afterwards denoted a meeting of the great feudatories of the crown, or tenants in capite. At a future period, the prelates came to bear a great sway in the nation; and these, together with the larger barons, and the king, constituted a parliament.

During all this period, though there had never been any law excluding the *smaller* tenants in capite from parliament, they had found it expedient to absent

themselves from this meeting; and, finding it very burdensome to attend these meetings, they wished to be altogether excused from this troublesome duty: but as the practice for granting subsidies began to creep in, and as these grants were supposed to be binding only upon those orders of the state which had voluntarily granted them, it was for the interest of the crown that none should escape. Henceforward the king, instead of requiring these leſser owners of property to attend in person, ordered them to choose deputies, who, by being properly authorised, might act for the whole of that body. These were called knights of the shires, and burgeſses of cities, or, in other words, representatives. During all these, and other changes respecting procedure, too tedious to be here mentioned, the aſsembly continued to be called a *parliament*.

DURATION OF PARLIAMENTS.

2nd. Many disputes have arisen, and much altercation daily at present takes place, respecting the old and original terms of duration of parliaments. It is well known, that at present the same parliament may continue to exist for seven years, and no longer. At a former period, not far distant, it could not exceed three years: and many persons believe the parliament formerly must have been renewed annually.* But when we

* This opinion of annual parliaments has been cherished by observing that it is stipulated in Magna Charta, and enforced by many remonstrances subsequent to it, "that parliaments shall be *held* once a year at least, or oftener, if need be." This was only a requisition that the constituent members of parliament should be called together, not that a new parliament should be made. But even this requisition was scarcely in any case complied with.

recollect, that originally the tenants in capite were, by birth, entitled to sit in parliament, and that none else were admitted into that aſsembly: that afterwards prelates were, *ex officio*, members of the national council, it will appear evident that there could be then no new parliament in the sense that phrase bears at this time; but that the same parliament always continued, with the partial changes that deaths and succeſsions must have occasioned. At a future period, when representatives were chosen for the smaller barons, and for cities, these were ordered by the king either to be chosen anew by the sheriff, or the same persons were required to come as long or as short a time as the crown pleased; so that the changes might be either total or partial, as suited the pleasure of the prince. It is only of late that even an idea has begun to prevail of the neceſsity of an entire new election of representatives; and consequently it is only since that time that a new parliament, according to modern ideas, could be created. This is a curious subject for diſcuſsion, but too copious for our limits.

CHANGE OF IDEAS RESPECTING THE PRIVILEGE OF SITTING IN PARLIAMENT.

3d. In modern times a seat, as a representative in parliament, is courted as an honour, and it is purchased, as is generally alledged, at a very high price; hence we are apt to imagine that this must have been always the case. Some are even so shortsighted as to suppose, that if there was no idea of influence in the house, or of emoluments that might arise from that station, that men of moderate fortunes, merely from

patriotic principles, would be eager to perform the great duties of parliamentary busineſs. This, however, others will alledge, could not be expected. And their reasoning accords with the practice in former times. For a long while after repreſentatives were returned to parliament, it seems to have been a matter of great difficulty to compel them to attend; so that it became neceſsary to enforce their attendance by penal statutes; even while, as a farther indemnification for the loſs of time, the repreſentatives were paid by the constituents for their trouble. Still, however, they were so averse to this busineſs, that we have seen them devising various plans for shortening their seſsions, or for avoiding the neceſsity of coming up soon.*

* The following is the form used on dismiſsing the parliament in the year 1305, which will suggest some interesting ideas to the contemplative mind:

"All archbishops, bishops, and other prelates, earls, barons, knights "of shires, citizens, and burgeſses, *and all other of the commons, which* "*are come by the command of our sovereign lord the king* † to this par- "liament, the king gives them many thanks for their coming, and wills "that, as they have desired, they may return into their own country; "going forthwith, and without delay, notwithstanding other commands, "except the bishops, earls, barons, justices, and others who are of the "king's council, and those must not depart without leave of the king. "Those also who have busineſs have leave to follow it. And the knights "which are come for the shires, and others for the cities and boroughs, "may apply themselves to sir John Kirkeby, who will give them briefs "*to receive their wages in their several counties.* And the aforesaid John "de Kirkeby is hereby commanded to deliver to the chancellor the "names of all the knights of shires, and of all the citizens, and bur- "geſses that come for such briefs, for their expences." Parl. Hiſt. vol. i. page 127.

† [Would not this clause seem to infer, that the king either did exercise a right, or then claimed it, of summoning others of the commons, besides knights of shires, and burgeſses, if he pleased?]

PRECEDENTS.

4th. Many persons have imagined that the purity of parliament can only be maintained by having recourse to *precedents* in all difficult cases, and being governed by them: nothing can be more preposterous than this doctrine. The privileges we now enjoy have been obtained by an uninterrupted series of new regulations, either calculated to supply defects that were not sooner observed, or to correct evils that experience had discovered. Precedents may be found for almost every constitutional fault that could be named; and it was by a rigid adherence to this doctrine, that the unfortunate family of Stuart was misled and ruined. Whoever shall maintain this doctrine will soon find, that among the number of contradictory precedents, it is impoſsible to tell which should be adopted or rejected, without having recourse to his reasoning powers.—Since, then, reason must at last determine on the propriety of any measure, as suited to the state of the country at the time, it is surely the shortest and the safest road to have recourse to its decisions at once for discovering a proper rule to be adhered to.

GENERAL CONCLUSION.

Upon the whole, we may be able to perceive from the foregoing induction, that nothing is leſs secure than the liberties of a people when they are put into such circumstances as do not neceſsarily insure that constant attention to the imperceptible changes which the perpetually varying state of society must ever require. Our forefathers, and the founders of all the great kingdoms that now exist in Europe, enjoyed that

kind of equality of rights which, it is now in general supposed, constitutes the highest degree of political freedom. Every free man in the state was entitled, personally, to be present in the national assembly, a vote of which could not only make, but also unmake the king, at pleasure; and without the express concurrence of which no enterprise of consequence could be undertaken. There never was a law, of which any traces can be perceived, abridging any part of this liberty, till long after, by a gradual and unobserved dereliction of these privileges, the very idea of them had been entirely lost. Circumstances had rendered it inconvenient for individuals to exercise those functions that were once prized as of the highest importance, and they were disregarded. The king, who was at first only a temporary office-bearer, was continued in office, to avoid the trouble that would have attended frequent new elections. He was empowered, in the absence of those who had the privilege to controul his power, to exercise the executive departments of government until he should be forbid to do so.—Constantly attentive to his own concerns, his power thus gradually acquired fresh additions, while that of the people, each of whom was occupied about his own present concerns, dwindled almost to nothing. The king was thus invited not only to execute of himself the ordinary active functions of government, but he was even desired, or at least allowed, without opposition, to make laws, that his subjects might be freed from the trouble of doing so for themselves. In this manner, by a procedure the most natural that can be imagined, has been gradually established the despotism of Spain,

Portugal, France, and Germany, all of which nations poſseſsed, originally, a species of government in every respect the same with that of Great Britain. And if Britain has chanced to avoid the same fate, she owes it more to a happy coincidence of *disasters*, which we may now call *happy* circumstances, that occurred through accident, than to any preconcerted design. We have seen that in Britain twelve men were, at one time, chosen to transact the whole busineſs of the realm, in "order that the community might be saved the charge." The same thing happened in France, and the people there never perceived the consequences of this, or attempted to re-claim their former privileges.* In Germany, from the same motive, this power was intrusted to seven. These seven still continue, and are now dignified with the name of electors, while our twelve, by a fortunate accident, were soon dismiſsed, and their office annihilated.

Let men, from an attentive perusal of the records of these events, learn to be diffident in their notions of the permanency of any system of government that is calculated to lull the attention of the people asleep, by cherishing an idea that it is, or ever can be perfect. The exertions of power are unceasing, the sources of corruption are unfathomable, and the manner in which this poison may be administered is so inconceivably varied, that there is no means of counteracting it but by being continually on the watch. When, therefore, any one shall see a system of government arise, that the people who are to be subjected to its influence shall, in general, deem perfect, it requires no depth

* The present claims of the French rest on a different foundation.

of political sagacity to foretel that the termination of that government is at hand. "Let him that thinks he standeth take heed lest he fall." Let those who enjoy a *reasonable* share of political freedom be continually on their guard to preserve it by correcting the abuses that the active powers of government, wherever they are lodged, must ever engender. If a man acts with a becoming steadineſs in guarding against these rising abuses, he will perform the part of a good citizen while he lives, and will deserve to have his memory revered after his death.

It is impoſsible at this time to trace with absolute precision the changes that have taken place in the British constitution, or the constitution of any other kingdom upon the globe; because these changes have been gradual, and imperceptible at the time, as well as, for the most part, unforeseen and unexpected. These changes can only be perceived by taking a retrospective view of the same objects compared with each other at different periods of time; on which comparative view, like the different colours of the rainbow, where each has obtained their full brilliancy of tint, they are observed to be extremely diſsimilar, although it may be impoſsible to mark the precise point where the one ended or the other began. It is not very easy, indeed, for those who now attempt to trace even the *sensible* steps in the progreſs of political proceſsion, to fix the precise periods when each might have been distinctly perceptible; for annalists and historians having been, in general, little attentive to circumstances of this sort, have suffered them to paſs on without any note; and it is only from incidental notices which

occur in a general course of reading, that consistent notions on this head can be obtained: no wonder then that they should be unobserved by the bulk of mankind, and that so many errors on these topics should be propagated by writers who have no other object in view than to deceive or to amuse, with as little expence of thought, or labour of research, as posſible. If to this be added the popular harangues of demagogues in parliament, who have studied the art of speaking with a view to perplex rather than to unravel many intricate questions, and thus to draw their auditors unwarily to adopt the opinions that favour their party, we should have reason to be astonished indeed if the public in general could form just and consistent notions on such subjects. In attempting, therefore, the following slight sketch of what I conceive to have been the general progreſs of the British constitution, few things could more surprise the writer than that it should at the first sight meet with the general concurrence of his readers.

That the feudal system prevailed in Britain during the whole period of the Saxon line of kings, there seems to be no reason to doubt; and that many changes with regard to particular arrangements took place in that system during the troublesome period of the heptarchy, seems equally well ascertained. From the few circumstances that have been recorded during that time, little else can be collected, however, than that the regal government had become in some sort hereditary, although the order of succeſsion now universally acquiesced in was not yet established; nor was the power which the nobles claimed of substituting another by *election* by

any means relinquished by them. They retained, as they conceived it, the *right* to elect to the throne, though the exercise of that right had been seldom enforced. It also appears, that general councils were seldom called, except upon singular and extraordinary occasions; that the laws promulgated by the king were in force throughout his whole dominions; that, at the occasional meeting of the great council, those edicts which had not been repealed obtained the force of laws; and that the *magnates*, or nobles, exercised, each in his own domains, a sort of regal authority, subject only to the superintendence of the king, somewhat in the same manner as bishops now exercise spiritual jurisdiction in their respective dioceses, subject to the controul of the archbishop.

Such nearly was the state of the public mind respecting government in Britain at the time of the Norman conquest, as the transactions at that period sufficiently show. William, so long as he thought his succeſs doubtful, laid claim to the throne only in right of the *will* of Edward; and Harold availed himself of his power and popularity to obtain it by the election of his nobles. The decisive action at Hastings having given William the ascendency, he then claimed the crown by right of conquest; and supported his power by all the means that the feudal system gave him so fully the right to enforce. It was solely by his own authority, with the subordinate aid of his Norman barons, on whom lands had been liberally bestowed, and those of England who espoused his party, that he and his son reigned; and they exercised these feudal rights, as is well known, with the most

uncontrolled sway. The great council of the nation, or parliament, was then of no consequence in the state. If it acted at all, it was only as the tool of the prince, to give scarcely a nominal sanction to his decrees.

The unexpected accident which deprived Rufus of his life gave an opportunity to his brother, Henry, to exercise those talents of addreſs which constituted the basis of his character, with a view to obtain the good will of the people in his own favour. He had remarked the effect that the despotic proceedings of his father and brother had had upon the minds of the people. He, therefore, immediately summoned a parliament; and, in one of the most artful speeches that ever proceeded from the throne, he soothed their minds by insinuating his desire to reform abuses, and restore every thing as nearly as poſsible to the same state that it had been in at a period which few could know, but to which all looked back as to a state of the most enviable perfection. By their favour his purpose at the time was obtained: and, although he evidently showed, during the future periods of his life, that he had as little inclination as any of his predeceſsors to fetter the crown, yet the recollection of his doubtful right, and the benefit that he himself had derived from the popular favour, compelled him to pay more respect to the wishes of his nobles than his immediate predeceſsors had done, which induced these nobles to adhere to their acknowledged rights with some degree of pertinacity.

The recollection of past evils, and the fear of future misfortunes of the same sort, induced them to study the means of moderating the regal power, and of seizing every opportunity to establish their claim to

rights which they deemed eſsential for these purposes; and the weak administration of John produced that determined stand which they made in the plain of Runnimede, and which ended in his signing the *Magna Charta*, whereby they obtained a regal acknowledgment of their rights to certain claims which had never before been clearly acquiesced in.

Though it is not easy to say, whether the struggles for power between the clergy and the crown, about this period, tended to augment the liberties of the people directly; yet that they conduced ultimately to that point can scarcely be doubted, were it only from the habit which they induced of making men consider whether the present arrangements might not be erroneous. At an after time, when the rights which the clergy claimed came to be investigated with some degree of precision, the effects that such discuſsions had on the state of *civil* affairs are well known.

These feeble attempts however, both of the barons and the clergy, to moderate the power of the crown, would have been equally unavailing in Britain as in other European states, had it not been for the claims of this country on France, and the partial succeſs that some of our monarchs had in trying to enforce those claims. These partial succeſses proved so alluring to our princes, that they could not be induced to abandon the pursuit while the bare poſsibility of succeeding seemed within their reach; and the national vanity was so much flattered by it, that they were enabled to make exertions that would have been otherwise impracticable. The feudal institution, we have seen,

was calculated merely for internal defence, and was utterly inapplicable to offensive operations. The constitutional revenues of the crown, and the income of the grandees, though abundant for every neceſsary purpose while they remained at home, became alike wholly inadequate for the purposes of foreign warfare. The natural resources of regal income were, therefore, soon exhausted; and it became neceſsary to devise other means of augmenting its revenue, that were better adapted to the exigencies of the case and the present state of the nation. With this view, the grandees of the nation were frequently called together for the purpose of devising means for facilitating the great object of the conquest of France. No other means occurred than that of offering voluntary gifts to the crown from the different orders of the people, and these gifts acquired the name of *subsidies*; in order to obtain which as often and as abundantly as poſsible, the *people* were brought into parliament and coaxed, their petitions attended to, and their grievances partially redreſsed. And it was with a view to reach all orders of men, and to adapt themselves to every change of circumstances, that the alterations in our constitution above specified took place.

It would far exceed the limits of this eſsay to enter more fully into the subject at present. Let it then suffice barely to say, that many of our princes being improvident, and the grants to the crown from parliament often liberal, the old resources of government, such as fines, escheats, &c. were greatly diminished; so that grants from parliament became at length *neceſsary* and uninterrupted; but, in order to obtain them,

many conceſsions were made by the crown, which, under the struggles between the York and Lancastrian parties, gave rise to claims of *right* by the *people* that were not formerly recognised; and though the imperious Tudors refused to recognise these claims to their full extent, yet it required all the addreſs of Elizabeth to prevent them from being openly brought forward in parliament. Her weak succeſsor, unable to appreciate the tendency of Elizabeth's policy, claimed his prerogative with a high hand: his weaker son, continuing in the same track with an ill-advised temerity, was himself subjected on that account to the severest calamity; and, though this did not produce the desired effect at once, it paved the way for that Revolution which drove his family from the throne, and established with unequivocal authority those rights which constitute the basis of the freedom that we now enjoy, under a constitution which has been matured to its present state by the gradual improvements that have been *derived* from the experience of ages; a constitution which, if it shall be at all times modelled so as to be adapted to circumstances as they arise, may prove beneficial to our posterity for ages yet to come, but which can never, at any period of time, be fixed to an invariable standard.

On the Patent Hot-houses.

[*Continued from page* 290.]

THE PINERY AND STOVE.

THOSE houses that are calculated to rear the tenderest plants, and which require nearly the same degree of heat throughout the whole year, are called

stoves, the average temperature of which is usually about the ninetieth degree on Fahrenheit's thermometer. To keep up such a degree of heat in this climate during winter, has been hitherto found to be a matter of great difficulty and considerable expence. Experience has long since ascertained, that no heat could be produced by means of *flues* alone which was sufficient to effect the purposes required; and men have been driven from neceſsity alone to make use of oak bark. Having observed that this material, after having answered the ends of the tanner, if laid together in a great heap, gradually fell into a state of fermentation, and thus acquired a considerable heat which it retained for a long time, it has been formed into a bed in the lower part of the house, which, by communicating that heat (in its ascent to the higher parts of the house) to the plants placed in it, has, under a skilful management, in co-operation with the heat transmitted through the flues, been capable of preserving some tender exotics in life, if not in perfect health, for a considerable time. Oak bark, or, as it is sometimes called, tan, has been therefore deemed in general indispensably neceſsary in a stove.

But as bark is in every case an expensive article, and, in situations where it cannot be had but from a very great distance, that expence becomes greatly enhanced, it occurred to an ingenious gentleman (Mr. Wakefield of Liverpool) that in the county of Lancaster, where coal is cheap, and tan very difficult to be had, it might be *possible* to substitute the heat of *steam* in the place of tan in the stove; and by an in-

genious device he contrived to introduce steam below an exhausted tan-bed that had lost its heat, which, by rising slowly through the bed, warmed the plants in its ascent, in some measure after the same manner as hot tan used to do. The experiment has now been tried so fairly as to ascertain that it is *possible* thus to keep up the heat nearly as well as with bark, and that in some situations it may be leſs expensive. But to manage it properly requires a degree of attention that few operators can be found willing to bestow upon it: and, as it does not obviate the radical evils of the tan-bed, it can only be considered as a partial improvement that is applicable to particular local situations.

From what has been just stated it appears, that the great and radical uses of the tan-bed, and which render it indispensably neceſsary in the *stove* upon its usual construction, are, *first*, to augment the degree of heat produced by the use of flues; *secondly*, to make that heat in its ascent act upon the plants lower down in the house than could properly be effected by the flues alone; and, *thirdly*, to give an equability of temperature in the house, so as in some measure to counteract the irregularities in this respect that are unavoidable where flues alone are employed.

To these uses of the tan-bed may be added another, which is a consequence of the mode in which the heat is applied, and which, though useful in some respects, becomes in others extremely pernicious.

The strongest degree of heat produced by the tan, acting neceſsarily upon the pots in which the plants are contained, and the earth contained in these pots

being always of neceſsity moist, a considerable portion of that moisture is, by the heat, converted into steam, which, acting upon the leaves of the plants in its ascent, moistens and refreshes them. Thus far it is highly beneficial; but when it comes to touch the walls of the house, and the leaves or fruit of the plants where the heat is not very great, it is there condensed, and produces a moisture that is highly favourable to the production of mouldineſs, and cherishing to insects of various sorts. And as, during the cold weather in winter, especially if the atmosphere be moist and cloudy, it is impoſsible to introduce a circulation of air sufficient to carry off that moisture, without chilling the plants to death, the disease called *damp* is, under these circumstances, unavoidable; the destructive ravages of which are but too well known to require to be particularly specified in this place.

Another evil originating from this mode of applying heat is, the diseases incident to the *roots* of the plants when they are thus neceſsarily exposed to a degree of heat that no plant in a state of nature was ever intended to sustain. This source of disease in the stove has indeed been so little attended to, that I am afraid I shall find some difficulty in now causing it to be considered with that impartiality which long established prejudice will so powerfully oppose.

Ground-heat, as it is called, has been hitherto looked upon as so neceſsary and so beneficial in a stove, that I am persuaded scarcely one gardener who has had the management of such houses can be found that will not smile at an attempt to show that it either

can be hurtful, or can in anywise be dispensed with. That such a kind of heat is not neceſsary, however, it will be easy to prove, merely by bringing to the recollection of every reader, that no such thing as what we call a *ground-heat* occurs in the operations of nature in any part of the globe. The universal source of that heat which is the parent of vegetation in every climate on this globe is the sun; and that acts every where more powerfully on the surface of the earth, than any where below that surface. The roots of plants universally, as if it were to avoid the pernicious effects of that scorching heat, descend to a certain depth beneath that surface by burying themselves in the soil in search of moisture, where they enjoy a refreshing coolneſs, for the greatest part of their time, that is only feebly and partially disturbed by the momentary influence of the sun while in its meridian splendour. If, then, nature has been at so much pains to guard the roots of those plants that we here cultivate from the effects of heat in their native climate, where they thrive with the utmost poſsible degree of health and luxuriance, how can it be otherwise than hurtful to expose these roots to such a degree of heat as they are exposed to in this ill-judged artificial treatment? I need not do more than barely offer this hint to the discerning reader to satisfy him that it is high time to consider how a practice so unnatural, and of course erroneous, may be corrected.

In the patent stove the smoke-chamber rises upwards in the middle, and occupies the place of the tan-pit, leaving a foot-path all round, as in the annexed

diagram, p. 353, Fig. 1, in which A represents the smoke-chamber, as before described. B the chamber for heated air, rising upwards in the middle as in a common tan-pit, with a path all round, *d d*. C the roof of the air-chamber, which forms a platform on which the pots containing the pines are to be placed. This floor may consist of square tiles, having each a round cavity in its middle for receiving the pot. The sides *e e* of wood above the platform, and admit of being folded down towards *d* at pleasure. These sides rise to the height of some inches above the top of the pots. The cavities under the pots may be filled with rotted tan, or good vegetable mould, before the pots are placed upon them; and the interstices between the pots may be filled for a few inches in depth with the same. This may be moistened with water occasionally as it shall be wanted, which will be gently evaporated by the heat below, and thus produce an imperceptible steam that will moisten and refresh the leaves of the plants in the stove. Neither this moisture, nor any other that shall be occasionally introduced into the house by a more copious steaming or otherwise, can prove hurtful to the plants by generating a permanent damp, because it can be with ease ventilated and completely dried, without diminishing the heat, whenever it shall be necefsary, by means of the ventilator, described page 183. Should it be found by experience, or apprehended, that the small degree of heat thus communicated to the lower part of the pots will be in any respect pernicious to the roots of any kind of stove-plant, the danger will be entirely avoided by placing

the pots upon a stand that raises the bottom of the pot above the surface of the tan, or mould.

It is unneceſsary to describe here in a particular manner the peculiar mechanism by which these chambers are to be constructed; it is the *principle* only that is meant to be here explained. The mechanical part will be executed by those who are entrusted with the construction of these houses.

In the above diagram H represents the horizontal roof-glaſs, which should be just high enough above the platform C to admit the plants to stand, and no more; which will keep them at all times immersed in the region of the hottest air.

Under this arrangement, it will appear that the air which is the most heated from the smoke-chamber A will rise in the air-chamber B, where it will act upon the top and sides with considerable power, and thus transmit heat to the stove above. When the smoke-chamber is heated to its greatest degree, the heat that is thus transmitted may be sufficient for heating the stove, without admitting any of the heated air itself from the chamber B into the stove C: but when that heat abates, by turning a stop-cock, heated air may be permitted to rise through a pipe, as has been already described, page 288, so as to give the neceſsary temperature to the stove at all times. And when an auxiliary chamber of heated air is provided, as has been also particularly described, page 280, a sufficient degree of heat for the purposes wanted will be obtained long after the fire shall have been extinguished.

The stove, as well as the vinery, should be made of glaſs on all sides, the north not excepted, for the pur-

pose of giving as much light as poſsible; for light, I must repeat it, is of much greater importance to the health of plants, and in particular to the production of fruits, than is in general apprehended. I cannot, perhaps, better illustrate this truth than by stating the following experiment which accidentally occurred to me.

I have in my garden a summer-seat that fronts the east, with an opening nine feet in width. It is covered above with a sloping roof, which slants towards the opening, so that the light comes full upon the lower part of it, though it rises in the front part between two and three feet above the top of the opening. The whole is covered with a vine; and, thinking that the vine-leaves would make a lively and rural appearance if spread along the roof, I introduced some shoots into it for that purpose. These grew very well, and made tolerably vigorous shoots, especially towards the lower part, where it is most exposed to the light. But although there were some bunches of grapes upon the shoots of the first year, yet they all proved abortive, a very few berries only having set, and these soon fell off. The vine has been cut and trained in this kind of alcove for three years, but has never since showed the smallest rudiment of fruit on any part, though every twig of the same vine is full of fruit on the outside of the house. That this sterility can only be attributed to a deficiency of light is very obvious, seeing that the heat accumulated in the higher part of the alcove during the forenoon is very considerable. Besides, if it were only from the want of heat that the

vines did not prosper, the fruit would at least show itself, though it might not ripen. The fact is, that grapes in abundance are produced every year on the north side of this alcove without, though it is only in favourable seasons that they ripen.

Observing this fact, which was casually brought under notice, I wished to try the same experiment under different circumstances. My kitchen is on the ground floor (not sunk under ground); and, having two very large windows to the west, which is an open aspect there, it is extremely light and cheerful for a close chamber. I introduced a vine through a hole in the wall into this chamber in the month of March, and spread it along under the roof. The heat there being greater than without doors, though far short of that of a stove, or even an ordinary hot-house, it set out its buds sooner than in the external air; but it soon exhibited signs of a sickly appearance, and produced no fruit; in short, it did much worse than the vine in the alcove, which I could attribute to no other circumstance than the want of a sufficiency of light; for two holes were opened into it near the roof for the purpose of admitting fresh air. But towards the beginning of winter the shoots appeared to be so very sickly, that I withdrew them entirely, being satisfied that if they had been left till another season they would have died entirely.

These two facts show in a very perspicuous manner the great importance of *light* to the health, but still more particularly to the fructification of plants; and I will not deny, that these, added to many others that

are now pretty well known among philosophical inquirers concerning the effects of light on vegetation, have made me avaricious of light (if I may use that phrase) in hot-houses; so that I never will, without regret, have a single inch of opacity on any side where it can poſsibly be avoided.

Fig. 1.

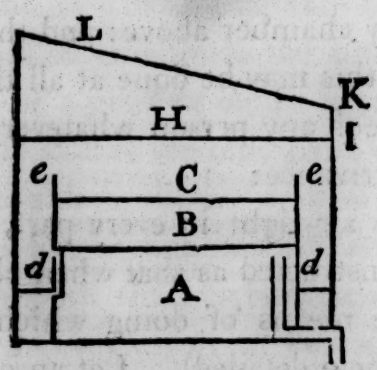
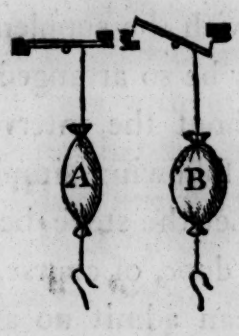


Fig. 2.



From this consideration also (exclusive of the too great heat in the stove for the vine), I should object to having any vines trained under the glaſs H in the pinery; but these may be, with much greater propriety, introduced into the chamber above the stove, and trained along the inside of the north glaſs of the roof from I to K, and thence towards L: for the front glaſses being entirely free from any incumbrances, as well as the east and west ends, the sun will be permitted to act on the house with its fullest influence, especially in the winter season, during every hour that it is above the horizon; so that the plants will then have nearly as much light as if they were in the open air.

When the heat in the stove falls below the degree that is requisite, it may be augmented by turning the stop-cock on the pipe communicating with the heated

air-chamber B, and thus admitting as much of the heated air as will be sufficient to raise the temperature to the proper degree; and should the heat at any time become too great, the cock communicating with the air-chamber below being stopped, the house may be cooled with the utmost facility, merely by turning the cock upon the pipe that communicates with the air, or with the supplementary chamber above: and things may be so arranged, that this may be done at all times without the intervention of any person whatever, by the following simple contrivance:

Let the stove be made air-tight in every part, and the door, of course, so constructed as that when closed it can admit no air (the means of doing which are simple, and need not be here detailed). Let an opening be made in the floor of the stove C into the heated air-chamber B, that is closed by a light valve which opens *upward*. Let another opening be made in the roof, or higher part of the stove, communicating either with the open air, or with the cool chamber above, which is closed by means of a light valve opening also upward. Things being thus arranged, and the heat in the chamber B raised above that of 90 degrees on Fahrenheit's scale, which is the heat of the stove, open the door of the stove a little (or any other opening in the lower part of the house); then open the lower valve, so as to admit heated air to rise freely into the house from the chamber below, the upper valve being kept close shut; and let this heated air flow into the stove (driving out the cooler air that was in it through the opening provided for that purpose), until the house has attained the requisite degree of heat, which we shall call 90 degrees. Then shut the house

quite close; if the heat continues unvaried for any length of time, the air will neither contract nor expand, and, being now in equilibrium with the open air, there will of course be no preſsure upon it in any part, either outward or inward: but say that the heat of the stove falls below the requisite degree, the air within the house will in that case contract, so as to occasion a kind of vacuum in the stove, and, of course, there will be a preſsure of air all round it from without inward: but as the only parts of the stove that are at all permeable to the air are the valves above described, it must follow that in this case there will be a preſsure upon both these valves as well as every where else: this preſsure must, of course, tend to close the upper valve, because it acts from above; while it must at the same time open the lower valve, because it there acts upon it from below. Thus will *heated* air be admitted into the house till it attain the degree of heat that it had lost, when it will resume its equilibrium with the open atmosphere as before; and then the valve will naturally close of itself, and thus deny admiſsion to any more heat. Say, on the other hand, that from the action of the sun, or any other cause, the heat in the stove be raised above the standard, the air within it will in this case be more expanded than before, and consequently will occasion a preſsure upon the walls all round. This preſsure will, of course, act upon the *upper* surface of the *lower* valve, and shut it close, so as to exclude all acceſs to the heated air; but it will act upon the *lower* surface of the *upper* valve so as to open it, and thus allow the overheated air to escape. When, by this means, the overheated air is thrown

off, and the stove resumes its standard temperature, the equilibrium between the stove and the external atmosphere will be restored, and the upper valve will close so as to suffer no more of the heat to escape. In this way the temperature of the house must be kept up at the same degree for any aſsignable length of time, were it even for the space of a whole year (for the small differences that would be occasioned by the variations of the weight of the atmosphere are so trifling as not to be worth minding, this being much leſs than every plant in any climate on the globe must neceſsarily be exposed to from the variations of the atmosphere in their native climate), without the attention of any person, if care only be taken that the heated air in the chamber below be never suffered to fall beneath the regulated degree of the stove (no matter how much higher it be); and this may at all times be ascertained by means of a thermometer whose ball is placed in the upper part of the chamber for heated air, and its graduated tube above the floor, so as to admit of its being examined at pleasure.

I scarcely need stop to point out the amazing difference that would thus be produced on the plants in the hot-house, compared with that to which they are unavoidably exposed in every house on the present construction, from the very great variations of temperature to which they are occasionally subjected. Even the most careful gardener that ever existed cannot be certain that he will not at one time add too much fuel, so as to produce a heat much greater than the plants can bear, or too little, so as to expose them at another time to a destructive degree of cold. Could he even keep himself awake continually, this could scarcely be

done; but when it is considered, that this must neceſsarily be intrusted to aſsistants, who may be careleſs or vindictive, and thus, through accident or design, be negligent in the discharge of their duty, the importance of the improvement just stated will appear in a conspicuous point of view. I will venture to say, that there is not an attentive and honest gardener existing, who has had the management of a stove for many years, who will not be forced to acknowledge that the damage which has been done to his master, in spite of his utmost care, from this very cause, has been much greater than he is able to calculate: some part of that damage he has been able to *perceive*; but there are, no doubt, many other instances that have eluded his own notice, as most of the mischief that has thus been done has never been known, or even suspected, by the owner of the stove. Perhaps I should not over-rate the mischief that has been thus done, on an average of all the stoves in the kingdom, if I should state it to be equal in value to the whole of the money that is annually expended on the stove itself: all of which will be in future entirely obviated for a charge, *once paid*, which need not exceed half a crown!!

If the interest of the owner of a stove be thus affected by this contrivance, the convenience and the comforts of the superintendant of that stove are still in a more powerful degree affected by it. Instead of being continually on the watch, and obliged to be out of bed many times in one night during the most inclement season of the year, and under a state of perpetual anxiety lest something should go wrong, he may now repose in perfect quiet, under the aſsured certainty that nothing can go wrong, and that in due time he

shall reap the fruit of his labours with scarcely a possibility of being amused with expectations that may prove fallacious. Hope may thus be indulged without anxiety, and enjoyment anticipated without the shadow of doubt. Who can calculate the difference between the comforts of a man in the one of these states and in the other?

This mode of regulating the heat, however, can only with propriety be carried into effect in the stove. In other cases it might be difficult, often improper, to render the house absolutely air-tight, in which situation only it could apply; neither could it be adopted in any case where there was not a reservoir of heated air below. In every situation, however, the heat may become occasionally too great for the purpose wanted; and in all such cases it will be a desirable thing to have such arrangements made as to prevent the possibility of danger being incurred from that cause. This danger may always be avoided by the following very simple contrivance, which will regulate itself as effectually as the other without any care in the superintendant.

Let a large bladder, or a globular bag of oiled silk, or other flexible material that is capable of retaining air, be provided: fill this bag *in part* with air when it is at the ordinary state of the atmosphere; fasten the neck of the bag firmly, and fix a string at the opposite end of the bag. Raise the heat of the hot-house then to the point that you would not wish the house ever to exceed; fasten an end of one of the strings to a fixed pin within the house, and the other end of it to the inside of a valve that is closed by a slight spring, so as to be quite tight when the valve is shut, the bag being

somewhat placed as in A, Fig. 2 [p. 353]. If the heat be augmented beyond the regulated degree, the air within the bag will be expanded, when it will aſume a more globular form, as in B, Fig. 2, and when, of course, the bag will become shorter than before; and as that shortens, the distance between the hook and the valve will be diminished; so that the valve must then be opened, and the hottest part of the air be thus permitted to escape. This opening, it is plain, can never be suffered to shut until the heat in the house abates, so as to reach the standard point, when the air within the bag, shrinking to its former size, suffers the bag to become long and flaccid, as in A, Fig. 2, when the valve is permitted to close. The maximum heat may be thus regulated with the most perfect certainty; and by making the hook moveable higher or lower by means of a screw, or otherwise, the point of maximum heat may be fixed either higher or lower, as shall suit the nature of the plants that are in the house.

It is scarcely neceſsary to observe, that this principle may be employed as a moving power in any direction, so as to apply to every case that can occur; for this must be obvious to every considerate observer: but it may be proper to take notice in this place (because the circumstance might perhaps be otherwise overlooked), that the same house may by this contrivance be adapted to raise plants of many different degrees of temperament, if it be sufficiently lofty. Those that require the greatest degree of heat should be placed in the most elevated station; and the valve adapted for that temperature should be placed in the very highest part of the ceiling. Those requiring the second degree of heat should be placed lower; and the

valve for regulating the temperature for them should be placed on the lower part of a tube that reaches to the second stage only. Those in the third degree should be placed still lower, and should have the regulating valve affixed to the end of a still longer tube; and so on to as many stages as shall be judged expedient. In a house thus constructed, it would be impoſsible for any claſs of plants ever to be subjected to a greater degree of heat than was perfectly suitable to them. The same effect might be produced by many other modes of arrangement which it would be tireſome here to enumerate; particularly by means of a box having a contractile neck, like hair-dreſsers bellows-puff, to act as an air thermometer.

The sides of the pine bed *e e* may be raised as high as the top of the pots, or higher; the higher the better, even if it should reach to the roof glaſs, or nearly so; but in that case the sides should be of glaſs all above the top of the pots. Were the bed so constructed, if mephitic air were occasionally introduced into the bed at the bottom, while an opening was made at the top to allow the lighter air to make its escape there, the plants might be bathed in that mephitic air, or carbonic acid gas, and thus refreshed by it; while the earth in which they grew might thus be impregnated with carbon, which is at present supposed to constitute the eſsential pabulum of plants. At any rate, by this means many experiments might be made which would ascertain a number of facts on this important subject that are at present unauthenticated. The carbonic gas, for the sake of experiment, might be easiest obtained from the fermenting vats in large breweries, where these were near, by first filling a close veſsel

with water, and immersing the nose of a pipe communicating with it into the stratum of gas above the vat, while the water was permitted to run off, and again emptying the vefsel of its gas by filling it with water while the nose of the air-pipe was placed in the bottom of the pine pit. Thus might the pit be filled with it to any height that should be judged expedient. If a part of the pine-pit only were cut off for the sake of these experiments, the comparative progrefs of the plants could thus be distinctly observed. The mephitic gas could be taken off at pleasure by turning a cock at the bottom of the pine-pit, opening into a descending pipe that communicated with the open air; while heated air, or steam, was introduced into the higher part of the bed, to permit it to run off by its natural gravity without occasioning any sort of vacuum.

The beneficial effects of steam in all kinds of hothouses, under a judicious management, are well known; and as houses on this construction are more perfectly adapted than any others for counteracting all the bad effects that have hitherto resulted from the use of steam, it may freely be employed as often as it shall be found necefsary, and will, no doubt, tend greatly to promote the health and vigour of the plants in it. A mode of producing steam for this purpose, that will put it more under the regulating power of the superintendant than has been hitherto in use, will be hereafter described. As, however, I do not consider this as an efsential principle, but merely an adjunct, it shall be deferred till we see whether it can be overtaken in our next Number; in which will be given some concluding notions concerning the general plan

and distribution of houses where they are intended to be upon a large scale; the means of economising fuel, where that becomes neceſsary; and several other particulars.

[*To be continued.*]

Observations made in an excursion into Scotland, by Viator.

INTRODUCTION.

I have been favoured, by an obliging correspondent who aſsumes the signature VIATOR, with some interesting and judicious remarks which have occurred to him from the objects that presented themselves during an excursion that he has made into Scotland; giving me full permiſsion to make what use of them I shall think proper. It is with regret I feel myself compelled to state, that the nature of my work precludes me from availing myself of that kind permiſsion to the extent that I could wish, by inserting the whole. Perhaps the writer of those remarks may think it proper, on farther consideration, to publish the whole, under the appellation of a tour in Scotland; in which form I can scarcely doubt that it would be favourably received by the public. Under that idea, I shall give an abbreviated sketch of the principal objects that have attracted his notice, with occasional extracts to serve as a specimen of the work itself. But, before I do this, it may not be improper to observe, though the reader will not fail to perceive it by the extracts, that the writer seems to be poſseſsed of no inconsiderable share of the milk of human kindneſs, together with a

disposition to avoid petulance and captiousneſs in every case; that he has not gone forth to spy "the nakedneſs of the land," or with a determination to put the worst construction on every thing. It appears to me, on the contrary, that this gentleman, having, like Mr. Pennant, been always in good humour himself, has thus discovered the valuable art of conciliating favour wherever he went, and, of course, has seldom found reason to be diſsatisfied with those with whom he had occasion to converse. Happy is it for those who travel with such a disposition. To them the sun aſsumes a softer glow, the trees a richer bloom, the fields a finer verdure, and the sky more cheering tints, than to other travellers. Even the most churlish of men aſsume to him a milder tone and a smoother brow than others; and the fairer sex enchant him with their smiles, and cheer him with their songs. Is it a wonder that, to such a man, nature appears alluring in every dreſs? Wherever he goes this kind of complacency accompanies him: but in no situation are its effects so powerfully experienced as in the simple scenes of rustic life. Persons in that station look upon every stranger, at first, with some degree of distrust. They consider themselves as inferior to persons of higher rank; and are in dread of experiencing contumely, or of being treated with disrespect. This makes the heart shrink, as it were, within itself, and the countenance aſsume a gloomy and repulsive aspect. They are afraid to speak their real thoughts, or to discover the genuine emotions of the soul, and are therefore often disgusting and unpleasing objects: but when a person above their own rank speaks to them in a

mild and condescending manner, afsumes a kind and benignant aspect, listens to them with attention, and seems to take an interest in their little concerns, their hearts expand within their bosoms like an opening bud when it feels the enlivening influence of the sun, and its beauties are displayed in all its native charms. The genuine feelings of nature are irresistibly engaging wherever they are recognised by one whose soul is susceptible of such impreſsions; and these are more frequently to be found in a cottage than on a throne. What an engaging pursuit, then, is it, to trace these so as to be able to recognise them under the various modifications which they are occasionally made to afsume in the different stations and circumstances of society! This is one delightful source of amusement, then, to the intelligent traveller; and such at least it seems to have been to my correspondent in this excursion, who seems to have marked the circumstances that affect the different ranks of society with no ordinary degree of discrimination.

Heads of some remarks made in an excursion through part of Scotland, by Viator.

It is impoſsible for any traveller who enters Scotland from England to overlook the barren nature of the ground in the first stage after he enters on Scottish land. *Viator*, like all others, takes notice of the barren and unkindly aspect of the common (as he calls it) which reaches almost to the gates of Berwick, through which he has to paſs, for nearly twenty miles, almost without the sight of a tree, or a field of cul-

tivated corn of any sort; but when he proceeds in his journey, and enters upon the rich cultivated fields that surround him on either hand as he paſses through the second stage, he cannot help looking back, and trying to account for the cause of such a striking diversity. These were the sensations of VIATOR: he recollected the mortal strife that for many ages prevailed between Scotland and England, and the little security which that afforded to any one to cultivate the land near the borders, which were perpetually subjected to the pillage of predatory bands of either nation that chose to make war upon the other. This easily accounts for the general state of sterility which is there observed to prevail: but it is difficult, he observes, to conceive it to be poſsible for the hand of industry, by any exertions of art, ever to render fields that are so very barren as those through which he first paſsed equal in fertility to most of those he met with in his second stage. That there may, however, be a fallacy in this mode of judging, he observes is very evident from many facts that are well known. The neighbourhood of every old town, he justly remarks, is distinguishable by its superior degree of fertility to that of the adjacent country, which can only be attributed to the art that has been used to ameliorate it, continued for ages. The same observation applies to the scite of old religious establishments in every part of Europe. These facts afford strong presumptions of the ameliorating powers of man when the arm of industry is not prevented from exerting its influence: but there are in this neighbourhood, he farther observes, still more undeniable evidences of this momentous truth; for he has

been assured, that many of the rich fields which he has just now passed by, and which are at present waving with the most luxuriant crops of grain, were, within the memory of man, not less barren than those which first presented themselves to him after he left Berwick. How fortunate for this country, he then exclaims, must that political regulation have been, which enabled the industrious inhabitants to cultivate their fields in peace, and enjoy the produce with security! This is *one*, and not the least of the many advantages that have resulted from the Union; since which time the voice of war has ceased in these lands, and the sword has been successfully converted into the ploughshare.

But why have not the whole of those wastes been converted into corn fields? Why, at this hour, are the *borders* (as the district on each side the line of demarcation between England and Scotland are here technically called) less cultivated than those contiguous to them on the north? And why is not the difference between the borders and the internal adjoining regions in England equally perceptible as it is in Scotland? These, he says, are questions which it is not in his power to answer; but he conceives, that an answer to these queries, by an intelligent person well acquainted with local circumstances, might lead to very important conclusions.

The first work of art that strongly attracted our traveller's notice in Scotland was, a very high bridge over a deep valley in the road; which was elevated to the great height that it bears, merely for the purpose of avoiding a long and steep ascent and descent in the

road on either side; for the little stream of water that runs below it scarcely deserves the name of a rivulet, far leſs of a river. This is called the *Pease Bridge*; a name which our traveller is much at a loſs to account for; as this part of the country is not peculiarly remarkable for the production of *pease* above other crops. "As well," says he, "might it be denominated *Wheat* or *Barley*, and still more so, *Bean* bridge, seeing that legume is rather more cultivated here, and appears to thrive better than the pea."

Though etymology be at all times a doubtful mean of acquiring knowledge, and therefore not deserving general attention; yet, as it may afford some satisfaction to our correspondent, and perhaps amusement to the reader, to explain it in this instance, seeing that it will afford a not uncurious specimen of one of the many ways in which mutations of language are effected, I shall venture to show the original of the word now called *pease* in this instance.

Path, in the English language, is nearly synonymous with *road*. It is a track made on a surface of the earth by the treading of animals upon it in the same line for a continuance of time. Before roads began to be made of hard materials, these paths, where the road was much frequented, were soon worn into a hollow kind of gutter, which retained the water during rainy weather in flat grounds, and, thus becoming miry, were frequently abandoned by the traveller, and new paths formed nearly parallel to the former, as conveniency suggested. Where these paths, however, went down a steep bank, it was often a matter of difficulty to find out a new track, so that the original path

could not there be abandoned; and, as the water during rainy weather flowed down this steep track with impetuosity, aſsuming a great degree of velocity where the descent was long, it there plowed up the soil like a torrent, and carried it to the bottom, forming in this way, in the course of time, large and deep trenches resembling the natural banks of a river in a mountainous country. Roads thus scooped out in declivities, wherever they occurred, came in time to be called, by way of emphasis, *paths*; and by degrees this phrase, when speaking of public roads, came to be applied to such deep gullies only. Hence, we find, the village of *Path-head* in Fifeshire is so denominated, because it stands at the head, or upper end, of such a path as that which I have just been describing. For the same reason, the very steep ascent and descent into this valley were worn into two long and very deep *paths*, so much larger and more tremendous than any others in the county, that this paſs came to be known by the name of *the paths* universally; and as the people of that county, in a great measure, suppreſs the sound of the *th* in pronouncing this word, and give a little turn to the *a* as if it were preceded by an *e*, it came by strangers to be mistaken for the word *pease*, and has at length come to be so called universally; exactly in the same manner as a house on the north banks of the Thames, a little below Woolwich, which was originally built for one of the name of *du Val*, a Frenchman, and was of course called *du Val's* house, has come now to be known by no other name than that of *the Devil's house* universally.

"This bridge," says VIATOR, "put me in mind

of some of the public works of the ancient Romans, and impreſsed me with a favourable idea of the enterprising spirit of the people of this country. It is a work of great magnificence, as well as immense utility; and is exactly of a similar kind with the aqueducts built in many parts of Europe while it was subjected to the power of Rome. It serves to form a level road acroſs a deep valley of great extent. The height of the bridge from the level of the top of the parapet is, as I was told, 123 feet; and the length of the bridge 300 feet. It is supported by four stately arches, which are not divided into several heights, forming so many *stories* (as they are called) above one another, like the Roman aqueducts, but stand upon very high pillars, which raise them at once to their whole height. The structure, when viewed from the valley below, appears light rather than maſsive; nor can the mind that has never been accustomed to contemplate such objects be at once reconciled to its proportions: it seems stupendous and wonderful, rather than elegant. The width of the bridge, too, being only fifteen feet in the clear, appears to be rather small; and the light railing of the parapet, on each side, looks so slender as to suggest the idea of insecurity to a traveller on horseback who looks down to the valley on either hand at such an immense depth below him; so that it requires him to be accustomed to the road to divest himself of the idea of danger as he moves along. Such, at least, were *my* sensations. Upon the whole, this work may be considered as one of the daring efforts of the present age; and in a *useful* point of view it will occupy a very high place; as it has opened a ready

communication between two districts of the country that formerly were disjoined by an almost insurmountable pafs; and the recent agricultural improvements in this district owe their origin in a great measure to this cause. This bridge was erected in the year 1786, at the expence of upwards of 5000l."

Our traveller notices with rapture the clofenefs of the corn fields, and the luxuriance of the crops of all kinds, in the ride from this pafs to Haddington, by the way of Dunbar, which, in some respects, he compares to that of the Isle of Thanet at the mouth of the Thames. If the last exceeds the former in a small degree in the richnefs of its soil, this district has the advantage in point of extent, and, he is inclined to think, in the diversity of its crops, and the neatnefs of its agricultural operations. The crops are wheat, barley, oats, flax, (beans universally horse-hoed, and extremely clean and luxuriant) pease, potatoes, clover, usually mixed with a small proportion of rye grafs, and turnips, which in particular exhibited an appearance of luxuriance of growth (being universally horse-hoed) that struck him as being singular. But it would exceed our limits to enlarge on these topics in this place. It is very evident that the writer was in a mood to be pleased at the time he minuted his remarks.

Neither shall we stop to detail his philosophical observations on the singular rock called the Bafs; or the beauties that struck him in the view acrofs the Frith of Forth at this place; or his attempt to account for the formation of the conical hill called *North Berwick Law* (all of which succefsively attracted his notice as he moved along); that we may thus be enabled to give

in his own words the remarks that occurred to him on his entry into Edinburgh, the ancient metropolis of Scotland.

"The high hill called Arthur's seat (he proceeds) had long attracted my notice as I approached it from the eastward; and its varying forms at different distances, as the direction of the road altered, had afforded me a very sensible gratification; but, as I came nearer to its base, it became every moment still more interesting. What appeared to be only one mountain till now, gradually separated itself into two as I skirted along its northern side; and the lumpish roundneſs of the maſs, which had formerly struck me as its principal characteristic form, now aſsumed a bolder prominence of feature. The rugged perpendicular front, to the west, gave it a more bold and picturesque appearance. It was now evening; the sun descended towards the horizon, and spread a mellow haze, tinted with a reddish hue, over the whole scene. The castle, indistinctly seen, rose aloft in the middle full in the west, forming a maſsy shade that the imagination could easily work upon at will. The spires of the town itself, nearer and more perceptible, and the irregular tops of houses, contributed greatly to heighten the beauty of the scene; and the towering hills to the right and left, still nearer to the eye, gave, on the whole, an enchanting wildneſs, that produced an effect which I had never experienced before, and which was augmented by the stillneſs and quiet that there prevailed, very unlike to the bustle that I had been accustomed to expect at the principal entrance (as this once was, but now is so no more) into the capital

city of an independent nation. This impreſsion was heightened by a near view of the fine ruins of the church of the abbey of Holyrood-house, once the seat of the Scottish kings, which stands in a small but rich vale, close under the rock called *Salisbury Craigs*, on the left hand, and overlooked on the right by the irregular mount called Calton-hill. Silent it stands, its aspect dark and gloomy as a deserted habitation.

" Paſsing the entrance into the palace on the left, with my mind full of the melancholy images that the recollection of past events excited, I proceeded right forward, up a long and seemingly endleſs acclivity, through a street called Cannongate, of no inconsiderable width; in which are seen the remains of several houses of the nobility, now deserted, or converted to meaner uses. Though the houses here are of a considerable height, and most of them substantially built of stone, yet there is in this part every where an appearance of abandonment and decline. The general aspect of the whole is gloomy, the walls in general being much blackened by the abundance of coal smoke; for the walls, on account of the great durability of these houses, become in time tinged of a very dark hue. As I proceeded forward, however, the street being gently waved from the straight line, though free from abrupt angles, and becoming by degrees wider and wider, a prospect gradually opened in front that became more cheerful and inviting; so that, after ascending the best part of a mile, I found myself at length in a spacious street, with houses on each side very high, and well built; the street every where cased in the neatest manner with small dark coloured stones,

like those of London, but laid much more closely, with a wide foot-path on each side, and shops adorned in the London fashion in a very brilliant manner. This street seemed to terminate at a high building, by the side of which was seen the beautiful and uncommon tower of St. Giles's Church, worked in open work, resembling, as some think, the general appearance of the papal crown; a fine specimen of this kind of Gothic architecture. Nearer the place where I stood, in a small receſs at one side of the street, forming a sort of square, stands a singularly neat structure, called the Trone Church; a kind of modern Gothic, from a design given by Inigo Jones: and, truth to say, it is not the worst specimen of that great artist's works. Its situation is singularly happy, as it in part encroaches a little both on the principal street, here called the High Street (which at this place seems to be little short of a hundred feet in breadth), and a new street of great elegance that croſses it at right angles, called Bridge Street; so that the church becomes in both a conspicuous object. Here I turned to the right hand, to paſs along the North Bridge to the hotel where I was to take up my lodgings. In paſsing along this bridge, the scene was entirely changed. A fine building, the Register Office, designed by Adams, with a dome (rather low) in the centre, and two cupolas at the ends, stood full in front. The bridge here, like that of the Pease, is over a large and deep excavation, which separated the old town of Edinburgh from the fields on which the new town now stands, and forms an object strikingly singular to a person who beholds it for the first time. It declines

by a very easy descent towards the new-town, which is only a small degree below the level of the High Street at this place. The height of the bridge above the valley over which it stands is about one hundred feet, and its length is not, I suppose, less than two hundred yards. On the right-hand side as you pass along rises the Calton-hill to a great height, the bold west front of which coming quite near to the eye, presents an irregular mass of a kind of plum-pudding rock; on one of the near protuberances of which is placed a circular structure of no striking beauty, erected as a mausoleum to preserve the memory of Hume the historian. Above this, and at a greater distance, upon the very summit of the mount, rises, with a somewhat elegant irregularity, a turret erected as a habitation for the keeper of an observatory hard by it; and immediately under Hume's monument, close to the bottom of the rock, is placed an old Gothic church with its spire, which seems to be nearly under one's feet; and over that church, and many adjacent buildings which fill up the lower part of the valley at this place, the eye, just by the side of the hill, stretches over a vast extent of country which exhibited at this period a prospect of the most lovely amenity. Among the most st iking objects in this view were, the sea breaking in upon the land, enlivened by many white sails passing in various directions; the land, a rich corn country stretching around an extended bay; the distant horizon being undulated by various swells of greater and lesser height, among which the conical hill called North Berwick Law rises in lovely elegance high above the rest. The smoke of many villages, interspersed

with trees in the nearer scenes, give a richneſs in idea to the whole landscape, that was placid and soothing to the mind. Perhaps my mind was then in a tone to be pleased; but certain it is, that I have seldom been more highly delighted; and it did not occur to me, that a single object in this scene required to be altered. A true portrait would have made a beautiful landscape.

"The view from this bridge toward the left hand, though also beautiful, was leſs interesting than the other. An earthen mound, formed acroſs the vale out of the rubbish that has been cleared away in digging the foundation for the houses of the new-town, greatly injures the prospect; but still the leading features of it are grand and picturesque. The rock on which the castle stands rises frowning in darkened majesty directly from the vale; a church stands in the bottom of the vale, almost under the rock, whose lofty spire, backed by some luxuriant trees (now in the shade) that stand upon a rising ground near it to the right, serves to give a definite boundary on that hand, as the castle does on the left, to the prospect of a fine valley that stretches far to the west, enlivened also by its distant hills. The castle itself is a rugged, irregular, grand object, that in these respects has few equals in this island; and the back part of the houses of the old-town, mounting aloft to an immense altitude in irregular piles of infinite diversity in forms, projections, and magnitude, cannot perhaps be compared with any one object in nature so justly as to the pinnacled cliffs of the Alpine rocks, if they could be seen near at hand; but the windows, some of them open, and

others enlivened by human beings who were now enjoying the beauty of the prospect over the new-town, gave to the whole a look of *bizarrerie* (to borrow a French term) that I had never seen before, and excited a sensation of astonishment not unmixed with terror; for many of these piles appeared to be so old, and were in fact so lofty, as to seem to totter from their base, and threaten destruction to those below, as well as the inhabitants themselves, by their approaching fall: they are, nevertheleſs, perfectly safe; as I was aſsured that there is only one instance on record of an accident of this kind, and that was merely the blowing down of a chimney top during a violent hurricane, when two or three persons were killed in their beds by the stones going through the roof of a lower building. The regularity of the line of buildings in the new-town exhibits a striking contrast to the other, seen from this point of view."

Our traveller remained in Edinburgh four days, and during that period made the most diligent use of his time. He seems to have been pretty well read in the history of the country that he visited, as every traveller ought to be; and many objects thus became interesting to him which must otherwise have been viewed with the undiscerning eye of ignorance. The castle, therefore, which he knew had been often besieged and never taken, except by surprise, treachery, or famine; and the original scite of the town, which was made choice of because of the protection afforded to it by the castle, claimed his particular investigation; and he seems to have viewed the whole with an eye of intelligent observation that merits applause. He

soon made himself perfectly master of the ichnography of the place, and that of the adjacent objects; which, after having detailed the steps that he took for obtaining information, he sums up by the following description:

"The scite of the city of Edinburgh and its castle were so singular, and so happily calculated for defence against the arms that were in use at the time, as to have been pointed out by nature as a place of refuge in a country liable to the sudden inroads of a powerful neighbouring foe. Its extent was by nature confined within very narrow limits, that could not be exceeded; which gave rise to many of those singularities that are now observable about that place. The ridge on which it stands bears a very striking resemblance to the form of the human nose. Upon a level flat, which makes the eastern termination of it, stands the abbey of Holyrood-House, which was for several ages the principal habitation of the Scottish kings, and which occupies the very place that should constitute the flat of the nose between the eyes; the ridge in the middle continuing to rise with an easy and regular ascent to the western extremity, where it terminates by the rock on which the castle stands, which rises on three sides to a great height nearly perpendicularly; not lefs, as I should conceive, than two hundred feet from the level of the valley. This may be called the point of the nose, the valley continuing to run along each side of the ridge with very little elevation throughout its whole extent, and pafsing round the base of the castle. There are in fact two parallel roads, which are now streets for the greatest part of the way, that run from the

abbey westward along the flat on each side of the ridge, with one trifling artificial interruption only (the mound) forming a circuit of three miles nearly, turning round the castle, that are almost on a level the whole way; while the main street, called the High Street, paſses from the abbey to the castle in nearly the same direction, a distance of one mile complete, along the very middle of the ridge the whole way. Between these three parallel streets extend many narrow lanes; the descent from which, as you approach the castle, are extremely steep and precipitous, but become gradually leſs so as you approach the abbey. At the bottom of the castle, and for a considerable extent from thence on either side eastward, this valley consisted originally of a deep and swampy moraſs, which were termed the south and the north *lochs* (the word loch being synonymous with *lake* in England). This formed a natural defence to the place on three sides, so that a wall became neceſsary only upon the east end.

"Such was the scite that nature pointed out for this ancient place; and in this state it remained for many ages. Its security allured many inhabitants; and, as they could not easily extend the buildings beyond these natural limits, they were forced to crowd their houses very close upon each other, and raise the buildings to a great height: and, as the declivity is very considerable in some places, it has happened that the back parts of many of the buildings are of a stupendous height, while that towards the High Street is moderate. In one place, in particular, I observed that the building in front consisted of five stories only, while to the back part you can count no leſs than twelve; and

as this house of twelve stories high is reared upon a bank that is very high above the valley behind it, it is easy to conceive that its altitude must appear astonishing. Such is the cause of that peculiarity in the pinnacled look of the houses viewed from the back parts of the old-town, which struck me with so much wonder at first sight.

"As the numbers of people increased, it became neceſsary to extend the buildings in other directions; first eastward beyond the wall of the city towards the abbey, forming a large suburb called the Canongate (*gate* meaning here a road or street), where was the chief residence of the canons and other religious orders belonging to the abbey, whose sacred office preserved them from danger. Afterwards the south loch, being of much leſs breadth than the other, was filled up, and a street built along in that direction, now called the Cowgate; the city wall being extended to the southward of it, and turning round so as to terminate at the castle. In this street, though it be now occupied by the very lowest orders of the people, were placed the town houses of the principal nobility, and the foreign ambaſsadors, having gardens behind them. The house of the French ambaſsador is in existence at this day, and was occupied as a genteel dwelling-house about thirty years ago; but is now converted into a printing-house. I went into this place as a sort of curiosity, and found that the rooms had been ample and lofty, and the windows of a larger size than in most others of equal age. Within this wall the University also was included. The north loch continued as a piece of water till about thirty years ago, when the bridge

was thrown acroſs it, which gave rise to all the additions that have been made on that side, forming what they call the New-Town. At a period still later a bridge was thrown over the Cowgate Street, so as to connect the High Street with the University, and the numerous new buildings that have of late years been built on the south side. Thus does old Edinburgh now resemble a bird with its wings stretched out on either side."

We are sorry that our limits prevent us from being able to conclude this description in the present Number.

I doubt not but my readers will be well pleased to see the following *report*, which has been obligingly translated by a friend from the magazine Encyclopedique. There can be no doubt of its authenticity.

A report of travels made by order of the French government into the Ottoman Empire, Egypt, and Persia, during the six first years of the republic, read at the National Institute by citizen Olivier, associate, in the sitting of the sixth Pluviose.

DURING the first year of the republic, the executive council, sensible of the advantages which must result from travels into the Ottoman empire, Egypt, and Persia, whose objects should be the commerce, agriculture, natural-history, geography, medicine, and even our political relations with Turkey, persuaded that these countries had never been viewed in their true light, or that they had been only partially considered, and that there remained much knowledge to be gleaned, fixed their choice on citizen Bruguiere and myself to fulfil their intentions.

We received various instructions from each minister personally, and we set out from Paris on the 16th Brumaire, in the first year, with orders to embark at Toulon on board the corvette La Belette. From reasons which we are ignorant of, the corvette waited a long time in the road for sailing orders, and, after two or three months of expectation, she was obliged to be unrigged.

Surprised at so long a delay, and vexed thus to lose our time, or not to employ it more usefully, we wrote to the minister for foreign affairs to intreat him to hasten our departure, or to recall us, if government did not longer think our journey useful to the republic. The minister replied, that he had just sent orders to the agent for foreign affairs at Marseilles to seek for a neutral vefsel, on board of which we were to embark, as well as an able engineer, two lapidaries, and divers other citizens, whom government were sending to the Levant.

While waiting for our departure, we occupied ourselves in visiting the manufactories of Marseilles, in acquiring information respecting the different countries we were about to visit, and more particularly all that concerned the commerce which this town carried on with the Levant.

At last, towards the end of Germinal, we set sail, and arrived at Constantinople the second Prarial of the year one, after a good voyage, and without having stopped any where.

It is difficult to expref's the various sensations a traveller must feel on the sight of this great town and its inhabitants. The mixture of trees, houses, minarets, the canal of the Black Sea, the hills and vales on

its coasts, scutari, and the numerous villages situated on its shores, the sea of Marmora with its islands, Mount Olympus covered with snow, the variegated and fertile fields of Asia and Europe, the whole together presents such beautiful scenery as delight and astonish. One cannot be tired with viewing the natural beauties of the environs of Constantinople; and at the same time reflecting on the happy position of this immense town, the victualling of which is so close at hand, the defence so easy, whose harbour is at once safe, commodious, and vast: but if one extends the view a little farther, one sees the two shores of the mouth of the Black Sea torn to pieces by subterraneous fires for the space of several leagues. Every where different kinds of lava, various rocks decomposed, porphyry and granite of several colours, more or lefs changed, from the slow but succefsful action of a grand volcano. If we still extend our observations a few leagues, we discover to a great extent a bed of coal, which the Turks have not as yet known how to work.

We remained six months in this capital of the Ottoman empire, waiting for the envoy extraordinary of the republic, to receive orders from that government relative to our mifsion, and to the manner in which we should be treated; but more important objects at that moment fixed the attention of the government. Our letters remained unanswered, and we should have been in the greatest embarrafsment, if the minister from the republic had not provided for our most urgent wants.

After having observed this country, so interesting under every point of view, we made ample collections

of plants, birds, fish, insects, shells, and minerals; and, having sent two packets of seeds for the national garden of plants, we set out for the Dardanelles, thus being ready to enter the Archipelago early in the spring, or to return to Constantinople, in order to pursue our course on the southern shores of the Black Sea, in order to gain Armenia, Georgia, the Guilan, or the Chirvan, on the shores of the Caspian Sea, thence to travel through Persia from north to south, and to return by the Persian Gulph, Baſsora, Bagdat, Mesopotamia, and Aleppo; but not hearing any thing from government, and not being able to receive but a part of our allowance, we confined ourselves at that time to visit the different points of the sea of Marmora, the whole channel of the Dardanelles, the Troad, Tenedos, Scio, some parts of the coasts of Natolia, Miconi, Naxos, from whence we went into Crete.

Conformable to our instructions, we had sent to Constantinople plants of a sort of apple-tree, with an oblong fruit of an excellent taste, to be nursed up in the garden of our ambaſsador, which seemed suited to the climate of France, more especially the southern departments. We also sent plants of three sorts of oak, which we have not in our gardens nor forests. One is fit for ship-building; another, with a large cup, known in commerce under the name of *Avellonei*, it is the quercus ægliops; the third, that which produces the Levant acorn. We also added various shrubs, destined to enrich the national garden of plants. [N. B. The quercus ægliops has been succeſsfully cultivated in England for several years past in the fine grounds of Mr. White, near Manchester.]

Notwithstanding several well informed Europeans have travelled through this part of the Ottoman empire, and that many of them have published interesting observations on the policy, manners, customs, and religion of the Turks; although we have good books on the plants of the country, and its ancient history, we have nevertheleſs found an abundant harvest to reap even in that part of natural-history the most known, I mean that of plants.

But when we consider that the reptiles, the river fish, the insects, and terrestrial shells have never been observed by any traveller; that no one has made us acquainted with the riches which the Turks poſseſs in mineralogy, the mines of copper, pozzolanes, foſsil coal at the gates of the capital; the marbles of every sort, and so abundant in the islands of the sea of Marmora, and in the Archipelago; the agates, cornelians, calcedonies, in the cracks of the volcanised rocks; the mines of alum and sulphur, the mineral waters of every kind; in one word, if one remarks that no one traveller has observed this country relative to its internal productions of the earth, that part of natural-history which is so interesting, and which, from the observation of the different beds of earth and stone, the direction and structure of mountains, and by the comparison of individual foſsils which are there met with, ought to lead us to ascertain knowledge of the antiquity of our globe, and to the laws which govern it, as well as to the various catastrophes it has undergone, and of which the fabulous history of antiquity has transmitted to us some glimmerings, it may be easily imagined, that our observations directed towards

such objects as these could not fail to be very interesting.

We had resided four months in Candia; we had left Paris two years, and had not had any intelligence from the governing powers; we therefore thought it necefsary to renounce our first projects. Eager, however, to employ time as usefully as pofsible, we resolved to turn our steps towards Egypt, to travel through that country, so fruitful for observations, equally interesting to the politician and statesman, as to the philosopher, the naturalist, and the antiquary.

The situation of the French in Egypt was extremely irksome; their commerce was interrupted, they were oppreſsed at Cairo, some were ill treated by government, and the Consul was not in any way respected. Our first care was to study attentively the monstrous government of the Mamelukes, their forces, and their manners; to examine the revenues of Egypt, its present commerce, and the extent to which it might be carried under a just and equitable government.

We observed the ports of Alexandria, the road of Aboukir, the Delta, the course of the Nile, its periodical increase, the canals which the careleſsneſs of the Mamelukes had choked up, the monuments which the pride of kings had erected, and those which a religious duty had built. We carried our observations on the natural productions of Egypt, upon those which cultivation might introduce, upon the fertility of its soil, and the disorders to which its inhabitants are liable. We sought after the causes of the periodical winds. We examined if the plague, that disorder which is so rapid and so fatal, has its source in

Egypt, as some travellers have advanced, or if it is accidental and epidemic.

Our collections in natural-history have been very abundant. I had an opportunity of sending a third box of seeds from the Archipelago, Candia, and Egypt, to the national garden of plants.

[*To be concluded in our next.*]

Disquisitions respecting the Orang-otang, and the other animals of the Simia tribe.

No genus of the animal kingdom has more strongly attracted the notice of speculative men, or excited the disgust of most others, than the ape or monkey (*simia*) tribe; which includes an immense variety of species of different forms and magnitudes; all of them participating in some degree of the human form, though diverging from it by an immense variety of shades toward that of the canine species.

At the head of this clafs, because it more nearly resembles man than any of the others, is placed the *Orang-otang*; which, we are told, fignifies, in the language of the people who invented this name, the wild man. This creature so nearly in its size approaches to the stature of man, and in the structure of its body is organised so much like him in every respect, that the most skilful anatomists have been at a lofs to point out a distinctive difference by which they could *with certainty* be distinguished from each other; not only the skeleton of bare bones, but every muscle, being, in its general form and nicest articulations, similar in every respect. The foot indeed, were the human foot

never deformed, might serve to discriminate them; for this member in the orang-otang approaches in some degree to that of others of its genus, which in general approach rather nearer to the shape of the human hand than foot; the toes of the hinder feet being in that species in general nearly as long, and equally susceptible of a variety of movements, as the fingers. In the orang-otang, the toes, though shorter than those of most of the genus, are nevertheleſs longer than those of man, and somewhat differently arranged, the better to adapt it to the mode of life that nature evidently intended for this creature.

Travellers have given a variety of accounts of the orang-otang that have been highly exaggerated; and the most perfect variety of this species is so rare, that it has never till this hour been fully investigated by European examiners who were capable of the proper discriminations: even Buffon, with all his industry, could not obtain one of this sort from which he could make his descriptions; but notices of it have been given by so many persons worthy of credit, whose accuracy of observation may be confided in, that there seems to be no reason to doubt that such a creature does exist; and from the various accounts that have been given of it, collated, and divested of the fables to which a warm imagination may have given rise without any design to exaggerate, the following description seems to be near the truth.

The orang-otang, when it stands erect, exceeds five feet in height in some instances. It can walk erect in the manner of man; it can use a staff both by way of support, and for a weapon of defence; and bears

such a general resemblance to man, as might easily be mistaken for a savage of his species in a general point of view; but he would be supposed to be of an inelegant form, and distorted in some of his members. His thighs are under the usual proportion of man, and his limbs much more so, having scarcely the appearance of any calf to the leg: his knees can scarcely be brought into an erect position, always bending somewhat forward; the soles of his feet do not apply firm to the ground, but bend inward a little; and he walks, upon the whole, when in this position, in an infirm and tottering manner, so as, in some measure, to stand in need of a staff for support, like the bear who has been trained to walk in this position. This position, then, he only afsumes when he is much at leisure, and free from apprehension of danger. Fear makes him immediately quit this upright posture, and run on all fours to the nearest tree; to which he flies for refuge, like a cat pursued by a dog, and mounts it with an equal degree of security and nimbleneſs. His body, in all its members, is evidently adapted for climbing in preference to any other kind of exertion; and the strength of the muscles of his arms, the length and flexibility of his fingers both of feet and hands, enable him to lay such firm hold of the objects he catches at, as to give him an inconceivable degree of facility in moving among the branches of trees, like all others of his kind. He seems, therefore, rather to be an *arbustial*, if you will admit that term, than a terrestrial animal; and it has been found, wherever he has been brought under the power of man, that fruits, dry or green, are his favourite food; and that he cannot be brought to relish raw flesh of any kind.

It does not appear that the ancients were fully acquainted with this animal, as none of the exact descriptions that have been left of it by them accord with the genuine orang-otang, though they agree with some of the varieties of the *simia* claſs of animals; yet the popular accounts show, that he had been probably seen by some one among them: and there can be little reason to doubt that the accounts thus obscurely circulated had given rise to the *satyrus* of the Romans, and the poetical notions that prevailed respecting this imaginary being.

Among the moderns, there are many nations of men who seriously believe that, not only the orang-otang, but many other varieties of this claſs of animals, who depart much farther from the human form, are in reality a kind of human beings endowed with the reasoning faculty, and even that of speech, which they abstain from using merely through cunning; from a dread leſt, if it were known that they poſseſsed these faculties, they might be compelled to work; rather choosing to enjoy their natural freedom, than thus to become the slave and the tool of man.

It is, indeed, true, that every variety of this species of creatures delights in freedom almost above all others, and that no treatment can ever render a state of confinement tolerable to them. In every situation, while in this state, they languish, or become morose and mischievous. No kindneſs can ever obtain a return of good-will from them; and, if we carry them beyond the boundaries of their own natural instincts, they are the most indocile of all creatures. It is also true, however, that one of their most conspicuous natural instincts is a propensity to imitate what they see done

by other creatures; and, as their bodies are constructed so much after the model of our own, they can imitate human actions, so far as they have an opportunity of seeing them, with a surprising degree of dexterity. The muscles of their face, too, being as flexible as those of man, they can with ease throw them into arrangements that indicate in him expreſsion of mental sensations. They can laugh and cry, and make an infinity of grimaces, and distortions of countenance, that are irresistibly ludicrous: and, as these gestures in man are occasioned by certain sensations of mind, we not unnaturally are apt to attribute similar sensations to the creature who can so easily exhibit the same sort of appearances. Thus, as man often mimics another, and does it after a ludicrous manner with a design to render him ridiculous, we are apt to ascribe similar motives to the monkey when we observe his exaggerated attempts to imitate him, while in truth no such thing was ever once intended. He is not, therefore, a mimic of human actions to gratify his own risible faculties (a sensation that he never felt); but he makes a bungling imitation, merely because he feels himself poſseſsed of similar organs, and a natural instinct for imitation; exactly as a parrot learns to laugh without feeling any risible sensation, or squeak like a pig without experiencing any pain.

From the absolute indocility of this whole tribe of animals, Buffon, therefore, with good reason, concludes, that in regard to mental endowments, they rank very low in the scale of animated beings; for it is a rule that admits of perhaps no exception, that the docility of any animal (by docility I here mean the faculty of being brought, by means of art employed

for the purpose, to perform many actions with facility and addreſs which are not natural to the animal) bears a near proportion to the range of its mental powers. Thus it is that the elephant comes to know the meaning of the signs and words that his leader makes use of, so as to act almost in every case according to his wish; the dog and the horse discover an approximation to something of the same sort, and may be taught to do many things by signals that are scarcely perceptible to others; but the pig can scarcely be influenced by any other means than his relish for food to do any thing; and, though there be one instance of a pig (the learned pig) having been taught to understand very nice signals so well as to be able to pick up any letter or number indicated, yet the difficulty of teaching it this leſson was such, that, although the exhibiting of the animal brought a large fortune to its owner, and thus neceſsarily excited the cupidity of many, yet neither the person who taught that one, nor any other person, has been able to produce another of the same sort after a lapse of more than fifteen years.

In general, the instinctive impulses are stronger in proportion as the reasoning faculties of the animal are weak; in consequence of which, the most stupid of beings perform actions that, to the inattentive observer, seem to indicate a faculty of reasoning superior even to man himself. The *doubling* of the hare is of this sort. This creature, when hard pushed by the hounds, has been often observed to make a push to get as far before them as she can; then, turning short, return for a considerable distance in the very same track, retracing her footsteps with the utmost care; then, collecting all her strength, make a spring

as far as she can leap to one side, from whence she runs away in a different direction from her former path; and by this means frequently eludes her pursuers. Now, to a person who knows that the foot of the hare, where it touches the ground, leaves there a scent that the dogs follow with undeviating certainty, what conduct could appear the result of deeper reasoning than this? By retracing her steps she makes them follow the same track till they come to a point where it fails entirely. The huntsman knows, that had she contented herself with *there* jumping to one side, the dogs, when at fault, would beat the ground all round to a considerable distance, and must inevitably have recovered the track; too cautious, however, to overlook this consequence, the cunning hare, by stealing backward, baffles them in this attempt. Were they even to turn back, not knowing the precise point where she flew off, they cannot be prepared there to beat about for it more than at any other point; so that there is very little probability that they will ever find it: and, were it not for the reasoning of the huntsman after having remarked this device, there is not the most distant probability that ever the hounds, if left to themselves, would be able to find the track by which she had fled off. What reasoning by man can be more correct than that of the hare appears to be in this instance? How seldom, indeed, could the ingenuity of man contrive such an efficacious plan for evading his pursuers? Yet, in this instance, the hare reasoneth not at all. She is led by that unerring Power who endowed all created beings with the various faculties that they respectively poſseſs, by a mere instinctive impulse, and without the smallest exertion of reason

on her part, to do what she has done; just as a sparrow yelps, and a raven croaks, when they respectively exercise their organs of voice.

Instinct, in the instance just adduced, assumes so much the appearance of reason, that we cannot be surprised if they should seem, upon the first view, to be the same: very little reflection, however, will enable any one to perceive that reason has not the smallest share in it.

To draw the conclusions that reason would authorise, the facts on which that reasoning seems to be grounded must be known to the animal before the conclusions can be authorised. The hare must, in the first place, know that, as she moves along the surface of the earth, her feet leave a scent behind. If she does not know this, all the reasoning that we have supposed goes for nothing. She must next know, that the dogs who pursue her trace her by means of that scent, and nothing else. She must farther know, that that scent can be perceived only when the nose of the dog is very near to the track where her foot has rested. If she loses a single step in this chain the reasoning is gone, and the conclusion we draw from it is totally unauthorised. But where is the person who will seriously say that he in good earnest believes the silly hare to know all the facts above stated with the requisite precision? Besides, it never has been observed that *old hares* only possess the faculty of doubling. It is as much a natural habit of the species, as it is of the cat kind, to steal slowly forward upon any object that it wishes to seize, lay hold of it by a sudden bound, and often play with its captive for some time before it puts it to death.

But what proves decisively that the hare neither poſseſses the knowledge that must be supposed in this case, nor reasons upon it in the manner that seemed so likely to us, is, that she is evidently entirely unacquainted with another fact that must have been perceived if she had been indeed capable of marking the facts above stated at all, or drawing conslusions from them to influence her conduct. It is, that the scent is as entirely lost by putting her feet in water, as by jumping without touching the ground; it would, therefore, have answered her purpose better, first to run past a shallow pool of water, and then return to it, and wade through it to a much greater distance than she could jump, than to take the method that she always does. She might, were she capable of reasoning, be able in many cases to do it very effectually by running for a long distance in a shallow watery track of a road; but, instead of this, she still follows her natural instinct, by carefully avoiding the water in every poſsible situation. It is only, therefore, in *appearance* that this instinctive effort aſsumes the guise of reasoning.

Miserable, indeed, would the situation of mere animals be were they to be obliged to depend upon reasoning for their preservation and support. The aids that are to be derived from this source are too slow of acquisition to be anyways suited to the condition of these creatures, and the parts that are aſsigned to them to perform in the economy of nature. They are led by a safer and more undeviating instinct each to perform their several functions with promptitude and steadineſs at the moment when it behoves them to do so. The bee no sooner iſsues from its cell than it be-

gins its labours with alacrity; and *at once*, without previous instruction or detailed directions, leaves its hive in search of flowers; knows how to collect the honey and the wax, to deposit the one in the cells, and to bring the other into the state that is proper for its purposes. With that, and without either rule or compaſs, it constructs a cell which the most learned mathematicians, after the study of many years, have been forced to pronounce a model of perfection, according to the truest principles of mathematics, that could not be exceeded by the operations of a man of the highest talents, aided by the utmost exertions of his reasoning powers, after he had spent a long life in trying to perfect them.

The instinctive labours of the bee, however, though they must surprise every person who contemplates them, do not go beyond the bounds of poſsibility for the reasoning faculty to comprehend; but other insects, if we were to suppose that they acted from reasoning, and not from the irresistible impulses of a blind instinct, must be supposed to be so far superior to man as to go infinitely beyond the powers of his comprehension. This little insect, who never saw its parent, and who never can see its offspring, which exists but for a few days, and has no instructor in the universe;—in spite of all these circumstances, that must so inevitably circumscribe its knowledge to a point, and thus divest it of the only materials upon which the reasoning powers can be exerted,—acts as if it could see into futurity, and does many other things with the most perfect certainty that far exceed the human powers: it would seem to know the exact time when its eggs will be hatched, and the

precise kind of food that is best adapted to nourish its young; it takes care to deposit that egg in the very place and manner, perhaps the only one in nature, where its young will find plenty of that food on which alone it can subsist, and that in the state of the utmost perfection for its use, at the moment when the young shall be brought to life. This so far exceeds the utmost perfection of the reasoning powers of man, that he gives up attempting to account for the actions of these insects upon this principle, and unequivocally refers it to *instinct*. But the instincts of other animals, when they in any respect assume an appearance that does not go beyond his own reasoning powers, he is ever prone to confound with reason. This he has done in an eminent degree with regard to the orang-otang, and many others of the monkey tribe, whose actions being performed by organs similar to his own, he has been willing to say that they proceed from reflections of the same kind that operate upon his own mind, and thus to rank them as an inferior order only of rational creatures.

Reasoning, however, depends upon powers of the mind that are infinitely beyond the range that has been assigned to this order of animated beings. The lowest indication of the germ of reason in man is the power of speech. The mere uttering of articulate sounds, we know, is not confined to man alone; nor is it beyond the power of many animals to understand the meaning of certain signals when often repeated by man as indications of his will, whether these be denoted by sounds or gestures; but it is man only that can so understand the meaning of words as to receive ideas communicated in that way in a continued connexion. It

is the power of comprehending ideas after this manner which forms the basis of the reasoning faculty; and without it there can be none. Speech, then, is the most undeniable evidence of the rational powers of any creature, and this, in the sense here given, viz. that of communicating a chain of ideas from one creature to another, whether by signs or sounds, constitutes what I would call language, the distinguishing attribute of man alone.

The orang-otang, although he poſseſses the organs of speech in as perfect a manner in every particular as man himself, is utterly incapable of speech. This can originate from nothing but a total want of those mental powers which enable man, even in his early infancy, to catch the ideas conveyed by words, and thus to have the understanding enlightened. This an infant can evidently do long before it can modulate articulate sounds: an orang-otang, when it has attained the fullest maturity of which it is susceptible, never can do it in the smallest degree. It has no understanding; it is, therefore, mute. And, notwithstanding that its form so nearly approximates to that of man, it is a mere brute; and a brute that is far leſs susceptible of education and improvement than many others on this globe. Man has domesticated many, and brought them to be docile to a greater or leſser degree, in proportion to the extent of their mental powers; but this creature, in common with the whole claſs to which he belongs, is too stupid to be susceptible of education, or to feel the conciliating influence of kindneſs; but, following his natural instincts alone, he blindly imitates what he sees done before him, without conceiving the most distant idea of the pur-

poses which such actions are intended to effect. Observing this his natural propensity, men have sometimes availed themselves of it for their own profit. As these creatures are all much more expert climbers than man, he has occasionally employed them for the purpose of gathering fruits from tall trees that were otherwise inacceſsible. With this view, some persons in sport set themselves to throw nuts at each other within the view of the monkies, who are perched among the high boughs that are loaded with nuts. This sets the whole tribe in motion, who, with great nimbleneſs, gather the nuts from the trees and throw them at each other. These all neceſsarily fall to the ground, and are gathered up by the persons who wait the opportunity of doing it in safety after they have become tired of this exercise. Small, however, is the benefit that man can derive from such casual services. The whole of the monkey tribe are universally esteemed the most troublesome pests of society in those regions that are natural to them; nor is it one of the smallest advantages of the temperate zones that they are unfriendly to the constitution of these creatures, and of course freed from their endleſs depredations.

It has been often remarked, that of all the animals which inhabit this earth, man, in his infant state, is beyond all degree of comparison the most helpleſs. His instincts at the period of his birth seem to be confined to the mere faculty of sucking and deglutition alone; and were it not for the aſsiduities of maternal care, continued for a much longer period, and with infinitely greater precaution, than is neceſsary for any other creature, he must inevitably perish. Buffon, with his usual acuteneſs, has remarked, that this long

state of tutelage seems to be peculiarly neceſsary for the developement of his faculties as a *reasoning* being. By this means his perceptions of mind are awakened before his bodily powers are susceptible of exertion. His mind is thus first informed, which influences at every subsequent period his corporeal powers. This progreſs would be too slow for mere animals; their instincts are, therefore, proportionally stronger, as their reasoning powers are weaker, than his. They therefore act with infinitely greater promptitude, and quickly attain the full perfection of mental as well as bodily powers of which they are susceptible; and there they remain. Having no knowledge of past events, there is no progreſs of the species among any claſs of mere animals; they are all the same at this hour as they were at the earliest period that they have been observed. The orang-otang, in this as in all other particulars, is decisively in the same claſs with other animals. Man alone is susceptible of mental education by a communication of ideas by means of language, a knowledge of past events, and a progreſsive enlargement of understanding, if he chooses to avail himself of the faculties with which he is endowed; and is, without dispute, the sole lord of this universe.

To the Editor of Recreations in Agriculture, &c.

SIR,

As you have much raised the curiosity of the public by the account you have given of many foreign varieties of useful animals, permit one of your readers to request you will preſs the public to introduce some of them. With your leave I will point out one

to begin with. I mean the Minorca aſs, which is larger than they are in England, and very strong and hardy. I mention this the more, as by a peace the island may again be restored to the Spaniards, who will not allow of their being sent out of the island. Several of them may with ease be brought to England by the transports which are daily returning. Their swine appear also to be an object, being very large.

The large Aleppo aſs, with remarkably large ears, is also deserving of notice. I am, sir, with best wishes for your health that you may be able to pursue your useful labours, yours, I. B.

Communications of this sort will be always acceptable. It is a pity that useful hints of this kind are so seldom communicated to the public by those who have opportunities of observing them. Facts are much wanted in economics, on which alone just reasoning can be grounded.

To Correspondents.

THE friendly strictures of *Amicus* have been received, and are thankfully acknowledged. He does the Editor justice in thinking that he could not wantonly sport with the feelings of any human being. The paſsage he hints at (the first of the reading memorandums last Number) is justly censurable on that account. These were selected by a friend, in whose judgment the Editor confided, and the hurry in printing the last sheet prevented him from having it in his power to revise it with the care it would otherwise have received. He one more thanks *Amicus* for giving him this opportunity of expreſsing his regret that such a paſsage should have slipped in unnoticed. He trusts few such will be found.

Acknowledgments to other Correspondents deferred for want of room.

Erratum in our last.

Page 316, Delete the whole of the first paragraph of the Reading Memorandums.

30.

AUGUST 1801.

RECREATIONS, &c.

N° 6. Second Series, Vol. I.

A comparative view of the effects of rent and of tythe in influencing the price of corn.

In the discuſsions that now so frequently occur reſpecting the high price of grain, we often hear rent and tithe mentioned as causes of the very great enhancement of that article; and, in general, they seem to be viewed by these writers as operating precisely after the same manner in raising the price of bread-corn in this island. As it appears to me that they operate after a very different manner; and as it would lead, I think, to very erroneous conclusions were their effects considered of a similar tendency, I think it expedient to appropriate a few pages of this miscellany to the careful investigation of this question.

That there is a neceſsary connexion between the rent of corn land and the price of grain, and that the amount of the one influences the other in certain reſpects, will not be denied by any thinking person; though it is not every one that knows whether it be that the price of grain influences the amount of the rent of land, or the amount of rent that influences the

price of grain; but, till this point be ascertained, it is impoſsible to form adequate notions on the subject. With a view to do this, the following circumstances must be adverted to.

Grain, it is very evident, can in no case be raised without a certain degree of labour and expence, the price of which must be repaid to the grower, otherwise he cannot afford to produce it. This may be said, in the strictest sense, to constitute *its intrinsic* price.

Money being accounted the common measure of value, this price will be affected by the quantity of money that can be obtained for labour, in general, in that place at the time. The farmer must give those he employs wages in proportion to what they can get in other employments; so that, if these wages are high, the farmer's charge must be high also. And the *intrinsic price* of his corn must rise, as the rate of this expence is augmented.

The intrinsic price of grain, however, all other circumstances being alike, must vary with the fertility of the soil on which it is produced. On a rich soil, leſs labour and leſs seed will produce a given quantity of grain than they will do on a soil that is leſs productive; so that, strictly speaking, the intrinsic price of corn, when considered only in this point of view, will be different on almost every different field. How then, it may be asked, can its intrinsic value be apportioned over a vast tract of country, poſseſsing a diversity of soils of various degrees of fertility; and how shall matters be so managed, as that all the rearers of it shall draw nearly the same price for their grain, and have nearly the same profits?

All this is effected in the easiest and most natural manner by means of rent. *Rent* is, in fact, nothing else than a simple and ingenious contrivance, for equalising the profits to be drawn from fields of different degrees of fertility, and of local circumstances, which tend to augment or diminish the expence of culture. To make this plain, a few elucidations will be neceſsary.

In every country where men exist, there will be an effective demand for a certain quantity of grain: by *effective* demand, I mean a demand which must be supplied, that the inhabitants may all be properly subsisted. It is this demand which in all cases regulates the price of grain; for the quantity of grain required in this case must be had, and the price that is neceſsary for producing that quantity of corn must be paid, whatever that may be. These calls are of such a preſsing nature as not to be dispensed with.

For the sake of illustration we shall, in the present case, aſsume, that the whole of the different soils of the country are arranged into claſses according to their degrees of fertility; which claſses we shall at present denote by the letters A, B, C, D, E, F, G, &c. Let those fields comprehended in the claſs A be the richest; those in the claſs B the second; and so on, decreasing one degree in fertility for each claſs as you advance towards G. Now, as the expence of cultivating the least fertile soil is as great, or greater, than that of cultivating the most fertile field, it must happen, that if an equal quantity of grain, the produce of each claſs of fields, can be sold at the same price, the profit on cultivating the most fertile field will be greater, if no

precautions were taken to guard against it, than could be obtained by cultivating those which are leſs fertile. And as this profit will continue to decrease, as sterility increases, it must at last happen, whatever be the price of corn, that the expence of cultivating some of the inferior claſses of soils must equal, or exceed the value of the whole produce.

This being admitted, let us suppose that the effective demand was such as to raise the price of grain, say to ten shillings *per* bushel; and that the fields included in the claſs F could just admit of defraying all expences, and no more, when corn was at that price; that those in the claſs E could admit of being cultivated when the price was only nine shillings *per* bushel; and that, in like manner, the claſses D, C, B, and A, consisted of fields which could have barely paid the expences of cultivation, respectively, when the prices were at eight, seven, six, and five shillings *per* bushel.

In these circumstances it would happen, that those persons who poſseſsed the fields in the claſs of F would be able to afford no rent at all; nor could any rent be afforded in this case for those of G, or other more steril fields *for the purpose of rearing* corn: but it is also evident, that those who poſseſsed fields in the claſs E could not only pay the expence of cultivating them, but could also afford a rent to the proprietor equal to one shilling for every bushel of free produce; and in like manner those who poſseſsed the fields D, C, B, and A, would be able to afford a rent equal to two, three, four, and five shillings *per* bushel of their free produce respectively. Nor would the proprietors of

these rich fields find any difficulty in obtaining these rents; because farmers finding they could live equally well after paying such rents upon these soils, as they could afford to do upon the fields in the clafs F, without any rent at all, they would be equally willing to take these fields as the others. Thus it is that rent equalises the profit on different soils in the most natural and easy manner, without tending in any degree to affect the price of grain.

Let us, however, once more suppose, that the whole produce of all the fields in the clafses A, B, C, D, E, and F, were not sufficient to maintain the whole of the inhabitants of that district. In that case one of two things must happen: either the price of grain must rise to eleven shillings, so as to induce the owners of the fields in the clafs G to bring them into culture; or a supply must be brought from some other place to answer that demand. In the first case, the fields G being brought into culture, those in the clafs F would now be able to afford a rent equal to one shilling *per* bushel of free produce; and all the other clafses could admit a similar rise. Here then we clearly perceive, that it is the price of grain that affects the rent, and not the rent that affects the price of the grain, as has been very often mistakenly alledged.

The natural consequence of such an increased demand for grain, and augmentation of price, is the converting of barren fields into corn lands, which never otherwise could have become such. A much greater quantity of grain is thus produced than would otherwise have been pofsible; and a more spirited agriculture every where takes place. By these exertions the

fields which originally ranked in the clafs G pafs into that of F, and, by a gradual progrefsion, they slide succefsively into the clafses E, D, C, till at length they even reach the same station that the clafs A originally occupied itself. In consequence of every one of these steps, a prodigious augmentation in the quantity of corn reared is produced. The farmer is also enabled to sell it at a lower price than formerly, although he affords a higher rent; so that every member of the community is benefited by the change.

It is beautiful to trace the operation of natural causes on the physical and political world, when they are suffered to operate freely. When population is augmented, and industry flourishing in a nation, we have seen that it must of neceſsity occasion a greater demand for the products of agriculture than formerly. This gives a brisker sale, which augments the industry of the farmer: more corn is thus produced. Some people would call this a creation, because corn is obtained where it would never otherwise have been produced. This corn, once raised, produces more manure, which, judiciously applied to the soil, gives additional produce. In this manner a beneficial progrefsion is established, that admits of an extension, the limits of which no man can foresee. As the people increase, the means of supporting these people is augmented; so that a country, though it may be at the present moment seemingly capable of maintaining no more than barely its present inhabitants, may yet, by a gradual increase, under a judicious government, have that produce augmented so as to be able to support perhaps a *hundred* times its present population; and yet be even more

capable of furnishing subsistence to its inhabitants than it is at present. These particulars admit of the clearest proof, both by reasoning *a priori*, and by a fair induction of facts, which our limits alone at present forbid to enumerate. Nor is the converse of this proposition less demonstratively certain, *viz.* that by diminishing the number of inhabitants, and thus decreasing the demand for the produce of the fields, the quantity of that produce will be decreased,—the rents will of course fall,—the lands will slide back into the state that does not admit the expence of cultivation,—the total produce of all the fields, considered as an aggregate of grass and corn, will fall much short of what they formerly yielded,*—and the few inhabitants that remain will find only a scanty subsistence, where a much more numerous people formerly enjoyed plenty. It is thus the people of Palestine, though not one-hundredth of the number which once inhabited it in a state of abundance, now find a difficulty to pick up a scanty subsistence there. This, some persons may perhaps ascribe to the supernatural influence of divine malediction having dried up the sources of plenty there. To avoid arguing on this head, we need only turn our eyes to Spain, which, three centuries ago, nourished four times, at least, the number of people it now contains. It could then afford abundance of food for all

* When land is suffered to run into grass after being cultivated, unless it be that of the very richest quality, it gradually produces less and less than at first, so as in time to afford scarce any food at all for domestic animals. This is a fact that some inattentive observers will perhaps be disposed to controvert. I wish to God England were in that condition, as not to afford any proofs of it, which are at present but too numerous!

its people, and to spare: its inhabitants now are frequently obliged to have recourse to foreign aid to prevent them from starving. This phenomenon we are not to consider as in the smallest degree miraculous: it would have indeed been miraculous had it been otherwise.

Such are the natural operations of *rent* upon the production of grain, and the reciprocations between that and the price on a corn farm; which, though simple when once understood, and irresistible in its effects, is, like all the other reciprocations of nature, by no means obvious upon a superficial view of things. Private interest is in this, as it ought to be in every case in well regulated society, the true *primum mobile*, and the great source of public good; which, though operating unseen, never ceases one moment to act with unabating power, and undeviating steadineſs, for the general good, if it be not perverted by the futile regulations of some short-sighted politician.

Tythe is precisely the same with rent in *one* respect: they are both alike calculated to draw from the soil the means of subsistence for a body of men who bear no share in the trouble or expence of cultivating that soil. In this particular they are precisely alike; but in no one other that I can perceive: and their operation, in as far as concerns the public weal, will be found to be entirely different. This will, perhaps, be best manifested by having recourse to some practical illustrations.

Let us suppose, that a farmer poſseſses a tract of waste ground, the natural produce of which is just sufficient to enable him to pay a rent of five shillings

an acre, and no more; and that when corn sells at the rate of five shillings per bushel, the expence of cultivating that soil exceeds the average value of its produce a small matter; so that he finds it necefsary, under these circumstances, to suffer it to lie uncultivated, and of course it produces no corn.

Let us farther suppose, that the price of corn rises to 5s. and 6d. per bushel; the farmer then begins to feel, that if a certain portion of his land were converted into tillage, the rent continuing the same as formerly, he might derive a small profit from that; say perhaps three-pence per bushel in a favourable year. If he thinks this enough to indemnify him for his trouble and risk, he will then set himself to convert some part of his fields into tillage.

Let us farther suppose, that the average produce of such land when brought into proper tillage amounts to twelve bushels per acre. The total value of the produce then, if all sold, would amount to 66 shillings.

But the farmer can in no case sell the whole of his corn crop. In order to carry on his operations he must reserve seed, and corn to support his labourers and cattle employed necefsarily in rearing it. Instead of being able to sell the whole of the twelve bushels, its total produce, he must deduct then first the seed, say three bushels; and for the sustenance of his labourers and cattle, without entering into an attempt to get absolute accuracy in this case, say four bushels; in all seven bushels. There remains then only five bushels for sale, which, at 5s. and 6d. per bushel, is 27s. and 6d.

From this must be deducted

	s.	d.
For rent, by the supposition	5	0
For profit to the farmer on 5 bushels sold at 3d. per bushel	1	3
For expences including wages to servants, tear and wear of implements, interest of money, &c. &c.....	21	3
	27	6

Thus stands his account, free of tythe. From this, however, if tythe be exacted, must be deducted the tenth part of 66 shillings, which is 6s. and 7d ¼: but his profits, which would have amounted to only 1s. 3d. clear without tythe, cannot enable him to pay so much as one fourth part of this sum. He must, therefore, be a loser by this undertaking, and of course will be under the neceſsity of desisting from it; and the public must be deprived of the whole benefit that it might have derived from the corn that would have been thus produced. Before the farmer, then, can poſsibly go on in the production of corn under these circumstances, the price of corn must rise not to 5s. and 6d. only, but to more than 6s. and 6d. per bushel. Thus does tythe in every case tend at the same time to enhance the price of grain, and diminish the produce of the country.

Please also here to take notice that tythe, instead of being the tenth part of the free produce of the ground, as it is by many conceived to be, is four times at least the amount of the whole of that free produce in this case. Instead of being a tenth part even of the *saleable* produce, which in this case is only five

bushels, value 27s. 6d. it is 6s. 7d. ½, which is very nearly one-fourth part of it.

It also tends to retard the exertions of industry in the agricultural line to an astonishing degree; and by that means still farther to retard the improvement of our fields, and diminish the total amount of the produce of the country; so as to render it necefsary to have recourse to foreign aid, when no such thing could have been wanted had its baneful influence been withdrawn. To render this position evident, I shall beg leave to state one other illustrative case.

Let us suppose a tenant in the pofsefsion of a farm under the protection of a lease, which secures to him and his heirs, for a considerable number of years, the whole profits that he shall be able by his skill and industry, aided by a competent capital, to make it produce. The value of its present produce, we shall suppose, is not more than one shilling per acre; and, of course, it cannot defray, at once, the expence of cultivating the soil so as to render it productive. Let us farther suppose, that this man, in consequence of his skill, knows that by a judicious application of manures, draining, and proper culture in other respects, he will be able to bring that soil into such a tilth as that it shall be capable of producing such crops, as in the course of a certain period of years, shall be sufficient to repay him for his labour, and the heavy expence that must be incurred before it can be brought to produce corn of any sort. Let us farther state, that the expence to be incurred, at the first, does not amount to lefs than twenty pounds an acre before it can be made to produce any crop at all; but that, in conse-

quence of that expenditure at first, it could be put into such a condition as to yield, on an average of crops under judicious culture, at the rate of twenty bushels per acre: that at this rate, corn selling at five shillings per bushel, it will require ten years to repay to him the twenty pounds of capital that he had originally expended upon it, together with the legal interest on that sum during the time it was in advance, and that he contented himself with the profits which he was to derive from the sale of this improved produce during the remaining years of his lease. All this being supposed to happen where no tythe was paid, let us now see what would be the condition of this farmer if the tythe were not to be exacted.

After deducting seven bushels for seed and labouring support, the farmer would have annually thirteen bushels to dispose of, free from tythe; which, at 5s. per bushel, amounts to 65 shillings; from which deduct 20 shillings, as the interest of his capital, and 25s. as a sinking fund, and rent 1s.; in all, 46s.: which leaves 19 shillings a year behind, as the current expences of cultivating, including manures, for an average of years. After the tenth year, then, he draws 19s. per acre profit; before which time he had none at all.

But, had he the tythe to deduct from this produce, the case would stand thus: the tythe of 20 bushels is two; which, at 5 shillings per bushel, is 10 shillings. He cannot, therefore, save himself; he must lose this sum annually, and this without the possibility of ever getting any return for it. This kind of improvement must, therefore, be entirely at a stand in a country so

circumstanced. His grounds must continue to lie waste, instead of producing abundant harvests; and agricultural capital, instead of being applied with skill to cherish the industry of the farmer in the production of corn, must, where it can be obtained, be hoarded up, or applied in some other way where it can be made to yield a more adequate return. The country, instead of being improved, must therefore continue to lie in a comparative state of waste, from which it never can be reclaimed; though nothing could have been more easy, had it not been for this, or other injudicious regulations which tend to arrest the hand of agricultural exertion without proving beneficial to any one. Thus are the people deprived of the bread that is necefsary for their subsistence, and driven, by necefsity, to seek for foreign aid, thus putting themselves in the power of their enemies for their daily subsistence, and subjecting themselves to the management of jobbers and dealers, who, under these circumstances, can never be subjected to a reasonable controul, and who must batten beyond measure on the immoderate gains that are derived from the very vitals of most other clafses of the people.

Nor is the evil confined to this particular case; it extends itself through every arrangement of a corn farmer. It is in few cases that a farmer can wait for ten or twenty years for a return of his capital; in general, he expects that it shall be returned nearly by the first crop; and his arrangements are, for the most part, made with that presumption. If he lays out one pound an acre annually, for obtaining manures or superior dreſsing of any sort, he cannot be indemnified

without receiving back at least one pound two shillings of increased produce; but in this case the tythe comes to better than two shillings on that increased produce; so that here also he is a loser. Here then he must stop. In short, under every poſsible view that can be taken of this subject, tythe operates as a direct bar to the exertions of industry for the production of corn: and who can compute the deficiency of produce that results from this source! Without taking into our account the defalcation that results from the obstruction to the improvement of wastes (I speak not of commons, but of poor graſs-land that belongs to individual proprietors), and confining our view only to the diminution of the produce of corn lands originating in the last mentioned check to agricultural industry, which alone might be estimated, even perhaps in the first year, at not leſs than one-fourth part of the whole present produce of the kingdom; we shall find that this deficiency alone might be enough to enhance the price to the purchasers to perhaps the half of its whole amount.

Nor is this the whole of the evil that results from tythe in discouraging the cultivation of corn land. It deprives the farmer of the only resource that nature has provided for his indemnification in case of a scanty crop, in the rise of price which ought to be the neceſsary consequence of it. It is neceſsary that I should state this case in such a manner as to make it evident; for it seems to have been hitherto very little adverted to, or its effects upon the public in any degree appreciated.

In the example above, page 410, we have seen that where tythe is not exacted the farmer who would have

had a living profit, had the price been 5s. and 6d. per bushel, must neceſsarily be paid above 6s. and 6d. per bushel before he can be indemnified where the tythe is exacted.

Let us again suppose, that in consequence of an inclement season the crop has become deficient one-fourth in its usual quantity; so that instead of twelve bushels per acre, it amounts only to nine. It would seem, to a hasty observer, that if the price rises one-fourth, so that these nine bushels should bring the same price with the twelve in an ordinary year, the farmer would be indemnified. Yet this is not the case; for now, as formerly, the farmer must reserve his seed, and the food for labourers, &c. seven bushels; which, if deducted from his nine, leaves only two for sale, instead of five, which he could dispose of out of the twelve; but 5 bushels, at the rate of 5s. and 6d. is 27s. and 6d.; and two bushels, at the same rate, is only 11 shillings; to which must be added one-fourth of that sum, or 2s. and 9d. being the rise of price, in all 13s. and 9d. instead of 27s. and 6d. which is only one half of what his income was in a plentiful year with the low prices. The farmer, therefore, is no gainer by the rise of price, but a loser, as all purchasers of corn are by this change; and in this case he is a loser to double, at least, the amount of that of the purchaser; for the latter sustains only an amount of one fourth of what he expends *on this article* of sustenance only, whereas the farmer suffers a diminution of one half of his whole income. Nothing, then, can be so fallacious as the vulgar notion of judging of the enormous profits that the farmer derives from high prices that are occasioned by a deficiency of crop.

But severe as his loſs is in this case, that loſs is still farther augmented by reason of tythe wherever it is exacted. We have seen, page 410, that in the case above stated, the price to the consumer must be raised to above 6s. and 6d. per bushel, in consequence of the tythe, instead of 5s. and 6d. before the farmer can be indemnified. Now, the price of 5 bushels (the amount of his free produce in an average year) at 6s. and 6d. is 32s. and 6d.; from which, if you deduct the tythe of 12 bushels at 6s. and 6d. value 78s. that will be 7s. and 8d. there will remain 24s. and 10d. to the farmer; viz. 2s. and 8d. leſs than where no tythe was drawn at 5s. and 6d. per bushel.

But in the scanty crop, there being only 2 bushels of free produce, this, at 6s. and 6d. per bushel, is 13s. and 6d. to which add one-fourth (the rise of price) 3s. 4d. $\frac{1}{2}$; in all 16s. 10d. $\frac{1}{2}$. But the value of nine bushels, at 6s. and 6d. is 58s. and 6d. add one-fourth (the rise of price) viz. 14s. 7d. $\frac{1}{2}$; in all, 73s. 1d. $\frac{1}{2}$; which, divided by ten, for tythe, is 7s. 3d. $\frac{1}{4}$ which deducted from 16s. and 10d. $\frac{1}{2}$ there will remain only 9s. and 7d. to the farmer, instead of 27s. and 6d. (page 409) in an ordinary year, with the price of 5s. and 6d. where no tythe is exacted; or 24s. in a plentiful year at the low prices where the tythe is actually drawn. Thus it appears, that the farmer's profits are greatly diminished when there is a scanty crop, although there be a proportional rise of price even without tythe; but where tythe is drawn, that diminished profit is still farther greatly reduced thereby; so that, before the farmer can poſsibly be enabled to go on in his buſineſs without bankruptcy, the price to the con-

sumer must be still farther augmented, to the great detriment of every individual in the community, except the tythe owner alone, whose income is thereby augmented.

And what good purpose, it may be asked, is to be served by this general restriction to the exertions of industry? Under one point of view it would not seem to prove any benefit to the owner of the tythe. For if, in the present state of things, it prevents any improvement of the soil, he can never be benefited by the right that he holds to draw the tythe of that corn, which, in consequence of that very claim of right, never can be produced. It is true indeed, that although, in consequence of this arrangement, he can draw no more tythe than he would do if all such improved lands were to go free; yet, as the quantity of corn produced in the country is thereby greatly diminished, so as to be leſs than can supply the effective demand, yet, the price of that grain being greatly enhanced beyond what it would be, his income is thus augmented, though the quantity of tythe corn be the same, or leſs than before; so that, although the public in general deeply suffers by this circumstance, he himself *seems* to be rather a gainer by it. Such, no doubt, are the short-sighted views and selfish considerations that influence some persons; but the gain to them is rather apparent than real; for the price of every neceſsary article being raised at the same time, his general expenditure nearly keeps pace with the rise of his income. But the operation of tythe does not stop here; its influence goes farther, and produces a reaction that diminishes the income of the tythe owner himself in

a much higher degree than the small rise that is derived from the source just stated.

Every one knows that there has been a great deal of very good corn land in the kingdom that has been converted into grafs-land within the last fifty years; one great cause of which alteration has been the preſsure of the tythe upon corn lands, compared to that which it yields in grafs. The difference between the amount of the tythe in these two cases is such, as to be alone a very good profit to the farmer. This proves a powerful lure to divert his attention from the rearing of corn to that of grafs; and, though the average produce of the farm must be thus greatly diminished, yet, as the farmer's expences are still more diminished, he may find it, upon the whole, a profitable change to himself; so that he is thus tempted to adopt it, without throwing away a thought upon the consequences that may result from it to others. Setting aside other considerations for the present, I shall only take notice of the great defalcation that must thus be experienced in the circumstances of the tythe owner, whose income is not only greatly diminished, but whose expenditure is as neceſsarily augmented, in consequence of the rise of price in the neceſsaries of life that results from the great decrease in the quantity of grain produced in the island, and its consequent rise of price. Thus does it happen, that by straining the bow too tight it snaps asunder, and loses its whole influence at once; whereas, had it been used with moderation, it might have continued serviceable for many years.

From all these views of the subject, then, it appears

to be undeniable, that, whatever effect the rigid exaction of tythe may have on other parts of the community, it can in no sense prove beneficial in general to the owners of tythe, although it may happen that a few exceptions to the general rule occur. It would, therefore, be wise policy in that body of men to try if they could devise some more eligible and efficacious means of securing their income, than the tythe, under its present form, affords them. What that is, I may perhaps at another time endeavour to ascertain.

It may appear a matter of not uninteresting investigation to some persons, to discover how it should have happened that of two devices which have been carried into effect by the same set of men, for the purpose of drawing alike from the soil the means of subsistence to a certain body of men who do not take any concern in the cultivation of that soil, one should prove so highly beneficial, and the other so singularly prejudicial to the interests of the community at large. I shall, therefore, endeavour to unravel this seeming mystery, because it may lead to useful practical deductions in the science of political economy.

Men, it is sufficiently obvious, have gradually fallen into the practice of paying rent for land, merely in consequence of a great many practical efforts of the parties concerned each to promote his own interest in the best manner he could, and not from any preconceived idea of any particular plan, far lefs from any view of either augmenting or diminishing the public welfare. Philosophers and legislators had no concern whatever in prescribing rules, or influencing individuals, in this respect; each was left at perfect freedom

to adjust his own concerns in the best manner he could, under no other restraints than those which a regard to justice and mutual good faith suggest. This device, then, is merely the result of one of those harmonies in nature which the Supreme Being hath originally decreed should universally result from the operation of the principle of self-love, or individual interest, regulated by justice. This actuating principle of self-love, which so universally influences all human beings, is so perpetually awake, and so scrupulously accurate, in all investigations, that the smallest circumstance cannot escape its notice; and it is so fertile in resources, that it adapts itself instantly to the smallest change of circumstances with the most perfect propriety. It regards neither the past nor the future; the present alone is all about which it is interested; so that the smallest obstruction thwarting its views, from past arrangements that no longer accord with the present order of things, is immediately removed, and perfection for the present, in as far as the mutation of human affairs, and the weakneſs of human faculties will admit, is the neceſsary result of it.

The unceasing operation of this principle, exerted continually by many millions of human beings, effects, in a manner totally unseen by those who are to be benefited by it, and with the utmost ease and regularity, things that would far exceed the most exalted stretch of the human faculties only imperfectly to comprehend. An instance of this I gave (in regard to the supplying of the city of London with provisions) in a former Number of this work (Vol. III. page 40) to which I beg leave to refer the reader. The means of

equalising the value of the produce of land of different degrees of fertility, by means of rent, affords another example of the same kind: a device that human reason could not, *à priori*, have conceived; nor could any law that human wisdom could devise for restraining individuals in this respect, and for compelling them to act after any prescribed form, do any thing else than derange this harmony of nature, and introduce confusion and distreſs; because the law admits not of those frequent changes which the ever-varying state of human affairs renders indispensably neceſsary.

Here, then, we discover the clue that is to lead us out of this labyrinth, and explain the enigma that I proposed to solve. Would to God it were as easy to persuade fallible legislators to be diffident of the universality of their wisdom, and the stability of that power which they too often aſsume, as it will be to prove that they ought to be so.

Tythe is obviously a legislative arrangement. The idea of it never could have arisen from the concurring interests of individuals, mutually checking and correcting partial aberrations till circumstances brought it to settle in the form that it now aſsumes. It must have been originally of positive institution; the forms under which it was to be demanded and paid must have been prescribed, and the fulfilment of these regulations enforced by penalties. Like every other law, therefore, this one, if it should have been devised by the most consummate wisdom, so as to have been liable to no objection at the time it was enacted, could only be applicable to the then existing circumstances; and no sooner would these circumstances change, than

the regulations would become imperfect, because they were only properly adapted to circumstances that have now ceased to exist. But, though the changes in the state of human affairs are unceasing, yet these changes are so gradual as for the most part to escape notice at the time: like the growth of corn, whose progreſsion is invariable; yet it is by such imperceptible increments that the most steady observer is unable to mark a progreſs by any other means than that of comparing the whole plant at somewhat distant periods with some invariable standard. Such precisely is the progreſs of human affairs; but, as there is no invariable standard which can be readily applied in this case, it often happens that great and important changes have actually taken place before they are observed by any one; and, in general, these changes are very great indeed before they can become perceptible to legislators, who are, in too many cases, the last to *feel* them by the only sure touchstone of self-interest. It thus happens, that the political derangements which arise from the unvariable regulations of the law, as applied to the never-ending mutability of human affairs, have proceeded very far, and produced very powerful influences, as affecting the interests of individuals in a silent and imperceptible manner, before they attract the notice of legislators in the smallest degree. What is the natural consequence of this? It being the interest of certain individuals that those derangements which have taken place, and in consequence of which they have obtained an undue advantage over other individuals, who suffer by it, should still continue, their utmost ingenuity is exerted to represent things to those

who are not immediately affected by the changes, in such a light as that the truth cannot be discovered. And, as the hope of gain operates as a stimulus of ten times more energy than the apprehension of loſs, and as men are in general disposed to act from habit, without much reflection, the regulations, now become faulty, are still continued in force; till, by degrees, the derangement has become so great, and the interest of so many powerful individuals is involved in the support of the established law, that it becomes more than a Herculean labour to effect a change in it. The Augean stable is so full that it requires a resolution greater than belongs to man (where his individual interest is not deeply involved in it) even to think of looking at it. In this way regulations that have been the result of prospective legislation, when they have been of long standing, are in general the source of the greatest political disorders that have ever prevailed among mankind; and too often lay the foundation of those tumultuous and illegal exceſses which are the forerunners of maſsacres, revolutions, and the destruction of empires.

In the infancy of society, while men live on fruits and the other spontaneous productions of the fields; even in the pastoral state, where herds and flocks have been reared on immense tracts appropriated to the support of a few inhabitants, and where, of course, the manners of the people are simple, and their wants are few, perhaps no mode of providing for the support of a select few, whose time was employed in the miniſtration of sacred duties, could be so natural, so little burdensome to the bulk of the people, and therefore

so proper, as that of tythe. Even where agriculture in the proper sense of the word has begun to be practised, where a few fields are tilled up in the best parts of the soil, without the neceſsity of manuring or expensive culture, and where these fields may be abandoned as soon as the crops begin to fall off, and other fresh and fertile fields may be converted into corn lands in their stead; when the notion of permanent property in land has scarcely begun to take place; where men are of course far removed from that state of society which gave rise to the idea of *rent*, and where their wants were abundantly supplied by furnishing what was neceſsary for the mere subsistence of the individuals who were entitled to receive it in that state of society; still the payment of tythe was so easy, and the amount of it so small, that it could have been in no respect burdensome to any one. But, after men have multiplied to such a degree, that the spontaneous produce of the fields is by no means sufficient to furnish a subsistence to the people; when it becomes neceſsary for that purpose to manure, to till, to dig, to drain moraſses, and to convert every field to that use for which it is best calculated to yield an abundant return; when the science of agriculture becomes an intricate study, and the practice of it a laborious and expensive employment; where it has become neceſsary not only to appropriate the soil to individual owners, but to make the cultivator purchase the liberty to cultivate that soil for a limited time by the payment of *rent*; where a diversity of arts have been introduced to furnish innumerable luxuries, that were totally unknown in the earlier state of society; where money

has been invented, and merchandise practised with a view to facilitate the exchange of these luxuries; where the original simplicity of manners has been long since abondoned, a difference of ranks established, and the accumulation of wealth, which constitutes power, has become a science studied by all; where more of the produce of the earth becomes necefsary to supply the wants of one man than might have been sufficient to support a thousand; and where, of course, what was only a small body set apart for particular purposes has become an immense multitude, which, like Aaron's serpent, threatens to devour all others:—In such a state of society, can it be supposed that those arrangements which were proper at the earlier periods can be in any degree suitable to the circumstances of the present times! No proposition, afsuredly, could be more absurd, than it would be to maintain that such is the case; yet in this predicament must all those place themselves who support the opinion that no alteration ought ever to be made in the mode of providing a subsistence for that body of men for whose use tythe was originally appropriated; and it is to the prevalence of this opinion that we are to attribute many of those political derangements which have long been felt, and have deeply affected this country; though the leading causes of these derangements have been but too little adverted to.

That a wonderful change in regard to the supply of food for its inhabitants has taken place in this island within the last half century, is acknowledged on all hands; the effects of which, especially of late years, have become such as to excite the most serious sen-

sations in every sober and deliberative mind. This evil, like most others, has been produced by the joint co-operation of many concurring causes; but among these there is no one that has contributed more seriously to augment the evil, or whose influence it will be more difficult to counteract, than the operation of *tythe*. This has been long felt in this and every other country in Europe; in some of which it has contributed largely to produce events that have justly filled the minds of men with astonishment and horror. In this country, from the general liberty that prevails, it operates in a different manner. Instead of being productive of that kind of oppreſsion which drives men to extremities, and terminates in bursts of daring desperation, which, once overleaping the mounds of law, admits of no barrier short of absolute destruction to circumscribe its fury;—men here have contrived to free themselves from the oppreſsive load rather by evasion than open force; so that the calamity comes upon us under a different form: its approaches are thus more slow, although its effects, unleſs they be more cautiously guarded against than seems to be as yet in the contemplation of most men, may, it is to be feared, be not leſs certain in the end, or leſs dreadful. Whole counties in some places, that were lately in corn, and ought still to have been so, are now converted into graſs lands; and large districts in every part of the country are in the same predicament. What man who reads this cannot point out large tracts that were excellent corn land within the memory of man, but are now in graſs? And all this has been done chiefly to avoid the expence of a corn tythe. The farmers

who occupied these lands—where are they gone? (for one grasier can occupy the room of twenty corn farms) the answer is easy; they are gone into trade or manufactures; have become settlers in some of our distant colonies, or have entered into some of those numerous employments which these so abundantly put within their reach. And what are the consequences of this change? The answer to this question is likewise but too easy. A dreadful deficiency in the quantity of human sustenance produced by our fields, is the necessary and unavoidable consequence of it: for it is a fact not to be controverted by any one who is acquainted with the subject, that good corn land, under a skilful mode of culture, may be made to afford four times the quantity of human sustenance (I speak here greatly below the truth) that the same land can ever be made to yield while it is in grass. From this cause it is that we at this present moment experience a defective supply of provisions in the home market, without any extraordinary inclemency of seasons, and an enormous rise of price, which deranges the economy of every family, and which, under the influence of another ill judged law dictated by humanity, threatens to strip the respectable part of the community (those especially in the agricultural line) of the little property that remains to them, in order to feed the inferior ranks, who, becoming thus less industrious, must become at the same time more wicked and disorderly; and thus augment instead of diminish the evil which at present we feel so oppressive.

Such is the natural progress of that political evil whose origin I have slightly marked, but whose ter-

mination no man at present can poſsibly foresee. I have probed the wound with a firm though gentle hand; from a wish, though I acknowledge without any hope, that it may induce some one who has more power than I have to apply a remedy while it still admits (if it really does admit) of a cure: an ineffectual wish is all that falls to my share.

I am sufficiently aware that there are some short-sighted persons who believe, and many interested writers who wish to persuade their readers, that there has been of late years more ground brought into tillage in England than has been abstracted from it; and the number of bills that have been paſsed for the inclosure of commons is the pretext which they lay hold of for bewildering the judgment of their readers. No man, however, who opens his eyes, and does not shut his ears against the information that he will receive in travelling through this country, if he seriously wishes to receive information, can be faſcinated by this *ignis fatuus*. He must see every where, a few small districts only excepted, immense tracts of graſs land that in the memory of man were corn lands; and even, respecting the commons that have been inclosed, in nine cases out of ten he will find that where they have been brought into culture, other corn land has been laid into graſs to make room for that culture; and that for the most part these commons themselves have been again abandoned by the plough long before they were in a state that would have made graſs the proper crop.

To the Editor of Recreations in Agriculture, &c.

SIR, August 1, 1801.

I NOW take the opportunity of answering your statement of thoughts on the construction of waggons, as appeared in your miscellany some months past, but which I have but recently perused.

Your manner of exciting discuſsion cannot but be applauded; the subject is highly interesting, and deserving the strictest attention of every one whose concerns oblige them to make use of carriages for the conveyance of their goods; nay, it may be generally extended, inasmuch as the diminution of those neceſsary articles which horses consume tends to the general good by reducing the price of grain.

Willing to contribute my mite to your excellent work, from a principle of gratitude for the pleasure derived therefrom, I shall endeavour to prove the erroneous opinions inserted in that eſsay, by stating to you matters of fact gained solely by experience.

From a knowledge of the great defects in wheel carriages, it has been my peculiar study to improve those machines; it has been perpetually revolved in my mind; but, whether it arises from my slight knowledge of mechanics, or from a barrenneſs of invention, nothing has occurred to my imagination sufficiently demonstrative of the means neceſsary to be accomplished. The nature of my occupation has, however, given me most convincing proofs of the utility of waggons in the streets and vicinity of London; but do acknowledge my entire ignorance of agricultural implements.

Fifteen sacks of coals, containing 3 bushels each, are reckoned to weigh about 34cwt. and is as much as can be drawn in a cart of about 15cwt. by two strong horses (such as are ordinarily made use of), which is 24 bushels and a $\frac{1}{2}$ to each horse. Now, sir, a waggon whose weight is generally a ton, will take 39 sacks of coals, 4 ton 8 bushels, and requires no more than three horses, therefore each horse draws 36cwt. in the waggon as easily as 24 bushels and a $\frac{1}{2}$ in the cart, consequently every horse in the waggon conveys 12cwt. 9qrs. 9lb. of goods more than those used in carts. Does it not then very clearly appear, that half as much more is performed by that mode of carriage than what you wish to adopt?

Another convenience too attends waggons; should the third horse by accident fall, he is not so liable to be hurt, daily instances of which present themselves to our view; besides, they may be loaded with ease and safety without a horse; for if a cart be required to be loaded, it is neceſsary that a horse should be between the shafts, or an additional trouble is required to prop up the cart, and then there is danger of its falling, especially if accidentally any thing should be forced against it.

I differ likewise in opinion with you respecting their unwieldineſs, never having seen, out of the numbers I am in the habits of meeting with, a single instance of their being unproportionable in weight or magnitude; but, on the contrary, am justified in aſserting, that they are built on the slightest construction, and of the strongest materials.

The usual weight of one with six inch wheels does

not exceed a ton, yet you give me to understand 2 tons and a half is common. Respecting carts, nothing can lead me to discover any glaring defect in their mode of building by your reasoning, excepting those carts generally known by the name of carroons, which indeed are unusually ponderous.

Those used for the purpose of cleaning the streets cannot be easily remedied; it is absolutely necefsary that they should be their present height, in order that they may unload the better, which otherwise would cause considerably more trouble, and a great waste of time. Their external appearance is not altogether the most delightful, yet it would be uselefs to remove that filth. If you think this worthy your insertion, my future exertions shall not be wanting.

A COAL MERCHANT.

[I consider myself as greatly obliged to every gentleman who communicates with due deliberation any information that he seriously thinks can prove beneficial to the public; and that impartiality which I wish ever to preserve, will induce me to give it a place, if conveyed in a proper manner, however much it may occasionally differ from my own opinion. These considerations have induced me to insert the above. For obvious reasons, however, I decline to make any observations on the above, farther than to refer the reader to the paper to which these remarks relate.]

Notices concerning the patent hot-houses.

[*Continued from page* 364, *and concluded.*]

I SHALL conclude these notices with a few hints respecting the proper distribution and arrangement of the houses, and the economical management of the fuel.

Little need be said respecting the situation of these houses; for the situation that is the most suitable to other hot-houses in general will also be the most proper for these. With a view, however, to obtaining the fullest effect of light, I should be more solicitous to have them placed in a free open situation, and farther removed from the shade of other objects (whether trees, walls, or houses, especially to the east, north, and west) than seems to be in general aimed at: all mankind are sufficiently solicitous to have them open to the south.

Where a large range of hot-houses is wanted, it will be best to have the whole range in one line of contiguous houses, stretching from east to west without interruption. These houses may be distributed by partitions of glaſs, into as many divisions as shall be thought neceſsary, so as to have the heat of the different apartments regulated for the purposes which each of them is intended to answer. In the middle let there be a division A, which may be applied to the purpose of a green-house. The floor of this may be raised about two feet higher than the other houses, and below that may be conveniently placed an auxiliary reservoir of heated air for the stoves B and C,

which may be appropriated to the rearing of pines, or other of the more tender exotics. Below each of these is placed a smoke-chamber and an air-chamber, as described in the former Numbers of this work. The roof of these is flat; and above that may be a vinery, to be employed occasionally for the purpose of containing heated air. The two divisions D and E may be kept heated in a secondary degree by the contrivance, detailed p. 284, for rearing plants that require a more moderate temperature, and forcing peaches, cherries, and other fruits that require to be brought forward early, and a few of the earliest vines. F and G may be appropriated to vines that are wanted in April or May, &c. Above each of these, and below the sloping roof, should be a reservoir for heated air, to be applied as a vinery as before described.

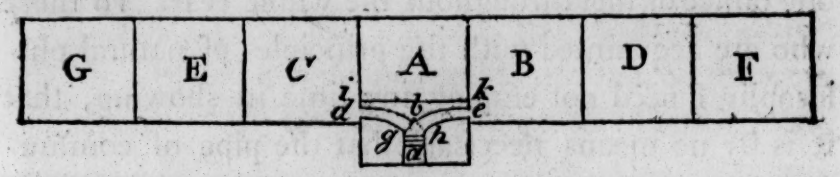
For the purpose of heating all these houses one fire only can ever be wanted, which should be placed at *a* in the centre; to which there is an entry from the north, descending to it by a stair as usual. The fire-place, for ordinary purposes, may be of the usual construction; but the chimney, after rising a little upwards, should be made to turn to the right and left, as from *a* to *d* and *e*. At *g b* is a valve moveable upon a pivot *b*; which, when in its present position, cuts off all communication between the fire and the stove C, leaving the passage open into the smoke-chamber of the stove B. When the heated smoke has been made to pass in this direction till it has filled the smoke-chamber B, and raised the heat in it as high as is required, if the valve be turned on its pivot *b* till it assumes the position marked by the dotted line *b h*,

the communication between the fire and the stove B will be cut off, and the whole of the heat and smoke will be made to pass into the smoke-chamber of the stove C, so as to raise the temperature in it to the degree required. If these houses be of large dimensions, and the fire moderate, these may be so proportioned as that the heat in the stove C will not be augmented so far as to be inconvenient, before the stove B has been so far cooled as to require a fresh accession of heat; and in that case the fire may be allowed to burn continually without requiring to be extinguished; but in ordinary cases, both the stoves may be successively heated to a sufficient degree, after burning a few hours, more or less, as the air is hot or cold; when the fire may be extinguished, and only re-lighted when circumstances indicate the utility of it. In every case, upon this construction, both stoves may be completely heated by once lighting the fire.

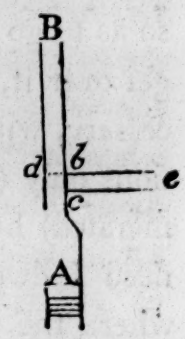
The chimney for carrying off the smoke, under the above arrangement, should be placed in the chambers F and G respectively; and the transmission of the smoke from one to the other should be as has been already described and illustrated by a diagram, see p. 284.

The above is upon the supposition that fire is to be lighted expressly for the purpose of heating the houses; and in situations where the hot-houses are far detached from every other building this must always be done; but there are innumerable situations where the dwelling-house is so near to the garden as to render it very practicable to apply the heat that must necessarily pass off by the kitchen chimney so as to heat

the hot-houses without the smallest waste of fuel whatever.



To do this, all that is necessary is, to open a communication between the kitchen chimney and the hot-house and fit a moveable valve to it, as is represented in the margin; in which A represents the kitchen range, and B the chimney rising to the top of the the building. *e* represents an additional chimney, or pipe of communication, that terminates in the smoke-chamber of the stove, the opening into which is at present closed by the valve *b c*; so that the smoke, while it remains in this position, is suffered to pass freely up the chimney as usual. But, should the gardener find that the heat in his stove requires to be renewed, he has only to turn the valve upon its moveable pivot *b*, so as to bring it into the position of the dotted line *b d*, which by closing the upright chimney and opening the tube *e*, forces the heated smoke to pass into the smoke chamber of the stove. When the stove has been thus sufficiently heated, the valve, by being brought into its first position *b c*, leaves the chimney open as at first to allow the smoke to rise as usual, and thus pass off into the atmosphere. These changes may be made as often as you please, without deranging the operations of the kitchen in the smallest degree; or even being perceptible by those who are busied in the culinary operations of it.



Thus may the largest hot-house in England be effectually heated without occasioning the consumption of one ounce of fuel throughout the whole year. To those who are acquainted with the principles of natural philosophy I need not employ any time in showing, that it is by no means necessary that the pipe of communication *e* should be carried forward in a horizontal, or in an ascending position to the hot-house, so as to prevent this mode of transmitting the heat from being applied where any intervening object shall prevent a direct communication; for such readers well know that this pipe may be either made to bend downwards so as to go under the obstruction, or upwards so as to get over it, or in any other direction that may be necessary, without difficulty; some well known precautions only (which need not here be particularly enumerated) being in this case to be adverted to. Neither need I dwell upon the facility of casing the pipe, where the passage is long, to prevent the cooling of the smoke in passing through it; these things now being sufficiently known to every person who is at all conversant in speculations of this nature.

That the middle division A may be suited to be applicable at the same time to the purposes of a green-house, and of an auxiliary reservoir for heated air to both the stoves B and C, it may be carried up to a considerable height without having any flat roof; and the pipe of communication between that and the stove ought to be so long as to have its bottom end to open at a short distance above the floor of the stove, and its upper end to open into the higher part of the green-house immediately under the roof glass; by this means

the heated air will be necessarily detained in the very top of the house, from whence it can be drawn back into the stove whenever the stove requires it. But if, at any time, it should be deemed of use to warm the lower part of the green-house to a small degree, it may be easily done by means of the ventilator: nor is it at all necessary to bring down that warm air when you wish to dry or ventilate the plants in the lower part of the house, as this may be very completely done without heating the air in the house in any degree. The temperature can thus be adjusted at all times with the nicest precision. A green-house on this construction will also readily admit of being managed in the way that has been before directed (p. 359) with a view to arrange plants in the same house that require various temperatures; so as to preserve many plants in the same house that require a great diversity in this respect.

Neither is it in the smallest degree incompatible with the nature of a green-house so constructed to be employed, partially, at least, as a vinery. For if the vines are led up within the back, or north wall, and under the north slope of the roof, they will grow as well as in any other position, and will yield a long succession of grapes from the same tree, that will attain maturity at very different periods of time.

The division *A*, which projects backwards from the line of the north wall of the general range, is intended to serve a purpose which should never be wanting where there are hot-houses of any sort; that is, a fruit-room. This lies immediately over the fire cellar, the roof of which constitutes the floor of the lowest

chamber of the fruit-room (for the height will admit of two). This should be separated from the green-house by a thin partition *i k*, made of brick or lath and plaster. There need be no windows into this room externally, but the light should be from the green-house by means of windows opening into it; neither can any fire-place be wanted. It should be lined all round with proper shelves for containing the fruit, and the temperature may be kept up to any degree that shall be judged most suitable, by means of the ventilator, and air-pipes judiciously arranged. The higher part of each of these fruit-chambers will always be warmer than that near the floor; which being known by the person who has the charge of it, will enable him to adopt many useful arrangements for accelerating or retarding the maturation of certain fruits as he shall see cause. By means of the ventilator he will also have it in his power to accelerate the drying of certain fruits and other vegetables, and thus to prevent the rotting mouldiness which is the cause of much destruction in every conservatory of fruit. All danger from frost may here be also effectually guarded against.

Where a strong heat is wanted, and where wood, or coal, or other fuel that produces much smoke is employed, it may be advisable to make use of the patent grate for consuming the smoke, which will greatly augment the power of such fuel: but it would take up too much room here to describe this contrivance. Those who are empowered to construct the hot-houses will always be able to furnish these grates to such as wish to have them.

PEACH-HOUSE.

There are few kinds of fruit that are in higher estimation with most people than the peach or nectarine; and therefore it is desirable to have the ripening of the fruit accelerated, so as to have it in use as long as poſsible: but under the common management this becomes rather expensive, because, as the peach requires to be in the open air during the winter, for the proper maturation of the wood, if the peach-trees are raised in the open mould within the house, so as not to admit of being moved from thence, the glaſses must neceſsarily be taken off the house, and laid aside during a considerable part of the season; which not only renders them useleſs then, but subjects them to much damage and expensive repairs in the moving: and if these trees be planted in tubs, or boxes, that admit of being carried out of the house by men, the roots become in a few years so much cramped in them, as to require a frequent supply of young trees, which are obliged to be thrown out when they attain nearly the size that would enable them to produce their fullest crop. These evils may be remedied, and the ripening of the fruit greatly accelerated, in houses on our construction, by the following device:

On the north side of the house let a parcel of oblong boxes be provided, that extend in length nine (or, if it shall be judged necessary, twelve) feet, and the width nearly that of one of the sash-frames. Let each of these boxes be placed upon four small wheels, which are made to move upon two parallel planks, as a rail-way; so as to admit of their being pushed forward, or pulled backward from the house, at pleasure,

to the neceſsary distance. In each of these boxes let one tree be planted, the box having been previously filled to a proper depth with mould properly prepared for the purpose. The stem of this tree should rise upright till it reaches within a few inches of the height of the horizontal glaſs which forms the ceiling of the hot-house; the shoots should there be bent forward at right angles, and the twigs trained in horizontally, and fastened to a slight frame of wood, with a large netting of wire stretched in it so as to keep each twig true in its place: the fore part of that frame to be supported, when drawn out of the house, by two rods provided for that purpose: when in the house, it may be fastened to the joists. A moveable shutter, to be provided for that purpose in the back part of the house, immediately under the horizontal glaſs, as has been mentioned already, p. 194, being opened when the tree is to be introduced into the house, the frame is paſsed through that opening, and the box pushed forward on its wheels; an aſsistant within supporting the frame, until it be pushed quite close to the glaſs, when the frame is to be properly secured within, the shutter put in, and the chinks around the stem of the tree where it enters closed up with well-tempered luting clay. This proceſs, though in description it may, to some, appear a little intricate, will be found in practice the easiest thing imaginable. The tree being thus placed, at the proper season of the year, will occupy the higher region of the house, where it will enjoy the benefit of the hottest air at all times, and the full influence of the sun every moment that it shines; so as to have the benefit both of heat and light: and here, of course,

the maturation of the fruit will not only be accelerated, but its colour and flavour be promoted in the highest degree. It is unneceſsary to add, that cherries or other fruits may be forced after the same manner, so as to give place for other plants that may be brought to maturity under the same glaſs at a different season of the year: nor need I specify, that if cucumbers or kidney-beans be reared within the house at the proper season, they may there continue to be gathered, if wanted, during the whole winter.

STRAWBERRIES.

If early strawberries be wanted, these may be obtained either in the vinery or peach-house, without deranging the operations, by the following arrangements:

Early in the spring, before the vines or other trees begin to push, let the strawberries in pots be placed in flat pans made of milled iron, having their edges turned up, and these pans be placed each upon an open frame of wood sufficiently strong to bear the weight. From each corner of these frames let a rope be paſsed upwards over a pulley fixed to the joists, from whence the rope may be paſsed along horizonally to other pullies fixed in like manner to the joists, and thence over a cylinder that turns upon an axis, by turning of which the whole of the frame with the pan and the pots that it contains, can be raised or lowered at pleasure. By this means the pots may be raised till they be close under the ceiling glaſs, and of course in the very warmest region of the house, where they will advance with great rapidity. Water may be adminis-

tered to the plants without lowering them, by being poured into the pans; and they can be lowered at the time when the fruit requires to be gathered, and immediately raised again. Lettuces, violets, or other low growing plants, may be forwarded during the winter by the same means.

MELONS.

This fruit has never been hitherto raised in this climate without the aid of hot dung. Dung, indeed, is useful for making all the plants of this genus prosper abundantly; so that well-rotted dung, or very rich earth strongly impregnated with manures, will always be useful: but hot dung may be dispensed with. These plants may be raised in pots filled with this rich earth, and either placed on shelves to support them near the glaſs close under which their vines may be trained, so as to give them the full benefit of the hottest air and sun; or a bed may be prepared for them on the floor, and a flat glaſs frame, that admits of being lifted off by hand at pleasure, placed over them, so close down as to give them the neceſsary heat. In this way may the same house, without any eſsential alterations, be made to answer all the purposes that can be effected by the various sorts of hot-houses that have been hitherto contrived, and at all the seasons of the year, with much leſs expence and trouble than has been heretofore neceſsary.

Unleſs it be for the stove, or the very earliest forcing of fruits, scarcely any artificial heat can ever be required; so that a smoke-chamber will be wanted in very few cases; and, of course, all the expence of that

apparatus will be saved. For moderately early forcing, however, or for preserving some plants of a very tender nature, it may happen, that during a long continuance of cloudy weather in winter the temperature may occasionally subside below the requisite degree. To provide for this poſsible case, the following device may be adopted:

Furnish yourself with an Argand's lamp, of the simplest construction that can be made, to burn with the cheapest kind of oil. Let a pipe reach from that lamp, which paſses through a hole in the lower part of the hot-house made for that purpose; so as to open a direct communication between the lamp and the open air, without communicating with the house until it has paſsed through the lamp. Instead of a cylindrical glaſs for the lamp, as usual, let a cylinder of metal be provided of a considerable height (about two feet will be a convenient length). After the lamp is lighted, invert over it a box of milled iron, or other metal, that is close on all sides, except one, which we shall call the mouth; which, being left open, is now turned downward, and which should be supported by a stand to nearly the same height with the burning part of the lamp, but not quite so low. This box ought to be so deep as to surmount the top of the metal pipe, or chimney, that conveys the heat from the lamp, a few inches. When the lamp is made to burn in this position, the heated air will first rise up and fill the upper part of the inside of the box, pushing out some of the cooler air below to make room for it; and, as it continues to burn, that heated air will gradually descend lower and lower in the box, until at length it will flow over the under

edges of the mouth, and rise into the house. It is well known, that the peculiar property of the Argand lamp is, that it consumes the smoke, and thus augments the heat produced by the waste of a given quantity of oil greatly beyond that of any other lamp; and, in consequence of its consuming that smoke, destroys the smell that would otherwise be emitted from the oil, and prevents it from sullying or injuring the bodies to which it is applied. Hence, should it be found necefsary, no harm will result from suffering the lamp to burn for some time after the heated air paſses over the brim of the box into the house itself. But, in general, if the box be made of a size large enough, that will not be necefsary; for, the lamp being extinguished when the box is filled with heated air, the heat will be transmitted gradually through the sides of the box into the house, so as to give it the requisite degree of warmth for a long continuance of time, without any direct communication with the air that has paſsed through the lamp. In this way, every particle of heat produced is directly applied to the purpose wanted, without the pofsibility of waste; and it is a question with me, whether this would not be, in almost every case, the very cheapest way of heating hot-houses of every kind; but for the purpose here required it adapts itself to the peculiarity of the case so exactly, and so easily, that it scarcely leaves room for a wish or hope of improvement. By means of the pipe of communication with the open air, the vacuum, which must have been experienced in the house in consequence of the consumption of air by the burning lamp, is entirely obviated; and, consequently, the cold that must

have resulted from the indraught of external air is prevented; and when the lamp is extinguished, and the contraction takes place that must be experienced as the heat in the house begins to abate, it produces no diminution of heat in the higher part of the house, because the neceſsary indraught of air at this time also enters through the same channel, and spreads itself upon the floor only; so that every thing here is arranged with the most happy propriety.

I shall not add farther to the length of these remarks, than merely to notice one other circumstance that must, I presume, have been observed by many practical gardeners; which is, that in the stove, and every other house in which plants are kept growing in the earth, it is impoſsible to prevent steam from rising from them in abundance, where the heat is at all considerable; and that, of course, in such houses there must be much greater danger of plants being affected by the damp than in such as are paved and kept dry; and as this last is often the case with vineries, the fruit, in such houses, will have a much smaller chance of being occasionally moulded, and consequently cracked and rusty, than in those that are kept dry. It must, therefore, be a bad practice in such houses to raise a steam in them by sprinkling water along the floors and flues while they are hot; especially in cold weather, when ventilation in the old way becomes impoſsible. It is very easy for any one, in the course of three or four days after the grapes are formed, thus to spoil all the grapes in his house; for, should they be allowed to remain so long, after such steaming, without a thorough ventilation, it will be then im-

poſsible to save them. In a house where the heat is kept up to a considerable degree, steaming, whether thus or otherwise, if not very soon followed by ventilation, (which is impracticable, on the common plan, in cold weather) must be highly dangerous; for, the steam, being hotter than the plants and walls, neceſsarily condenses upon them, and there remains. A moderate washing with cold water squirted through *very small* holes in the nozzle of a forcing pump, so as to make it aſsume the form of mist, will, in general, produce a more salutary effect. But, by the aid of our ventilator, all danger from this source may be completely and effectually avoided.

A report of travels made by order of the French government into the Ottoman Empire, Egypt, and Persia, during the six first years of the republic, read at the National Institute by citizen Olivier, associate, in the sitting of the sixth Pluviose.

[*Continued from page* 386.]

On the third Germinal we received letters from our envoy extraordinary, by which he invited us to quit Egypt, and to return to the shores of the Bosphorus, because the time was now arrived at length when we might put into execution those plans we had formed. More eastern regions, he said, called for us, and he was desirous of some personal conferences with us before we penetrated them. There were under the same cover two letters from citizen Desforgues, minister for foreign affairs. One was a copy of the one he had written to citizen Descorches, in which he demanded

a report of the sums we should be under the neceſsity of expending to perform our intended travels with dignity. He authorised him to furnish us, on account of our allowance, what we should have occasion for; to procure us the guides our miſsion required, and to obtain for us those documents which would be indispensable for our researches and our observations. He terminates his letter by saying, "In all cases these "two observers of nature will be subordinate to thee; "they will render to thee an account of all their ope- "rations, and thou wilt forward to me at the end of "every month the result of their remarks on the arts, "sciences, natural-history, commerce, and policy, in "order that I may be enabled to lay before the execu- "tive council their zeal, their labours, and their dis- "coveries." In the other letter, the minister informs us that he desires the citizen Descorches to send him an estimate of the common expences to which we are liable. He concludes by telling us to remit to the citizen Descorches our submiſsion in writing, and to act conformable to the directions contained in the letter he had written to him.

We were equally impatient to obey the orders of the minister as well as those of the envoy. We sent him our submiſsion; we finished our observations on Cairo and its environs, and we hastened to Alexandria. We embarked from that port the 11th Florial, and arrived at Constantinople after forty-eight days sail. We had the pleasure of anchoring at the islands of Rhodes and Lero, which we had not seen. A leak forced us to remain eight days at the first, and we staid

as long at the second, on account of the northerly winds.

During this interval citizen Descorches had been replaced by the citizen Veruinac. We presented to this envoy a new sketch of our operations since our arrival in the Levant; an account of the sums we had received; and a detailed memoir on the situation of the French in Egypt, on the government of the Mamelukes, on the productions and revenues of this country, on the cultivation of its lands, on its commerce, in short, on the ameliorations of which this country was capable. This memoir was concluded, by reflections which arose from the orders citizen Descorches had sent to the Consul and French at Cairo to come for the moment to Alexandria, and place themselves under the protection of the vefsels of the Grand Signior, and to wait there until more favourable circumstances should allow the Consul to resume his functions at Cairo, and the merchants their operations of commerce.

We sent to the national garden a fourth box of seeds from Egypt, Rhodes, Lero, and the straits of the Dardanelles, and also an ichneumon alive; which we had preserved for four or five months.

Persia, after experiencing all the horrors of a civil war, ever since the last reign of the Sophis (the family of the Sephevi) gave hopes of a flourishing government under a king who had triumphed over all his rivals, and had succefsively destroyed them. The occasion was therefore favourable to travel through this country, which is so interesting in every point of view.

The citizen Verninac had given to us the whole of our allowance, he empowered us to take a dragoman, furnished us with a letter for the first minister of the king of Persia, another for the Bashaw of Bagdat, at the same time he gave us different instructions, as well verbal as written.

The Porte having the intention of constructing a bason in the harbour of Constantinople on the model of that of Toulon, some Armenian merchants wished to gain information from us of an excellent pozzolane earth we had discovered, and offered us thirty thousand piastres. We were in the Levant under the orders of the republic, and we did not think it right to enter into any treaty with these Armenians, without previously consulting the envoy of the republic. Citizen Verninac was desirous that this bason should be constructed by French engineers; he advised us to reject the offers of the Armenians, promising that the Porte should more liberally indemnify us; and, without losing time, he sent the first dragoman of the embafsy to the Porte, to inform it of our discovery, and to offer our services.

The Porte seemed to accept these offers with gratitude; it demanded more particulars on the subject. We immediately drew up a memorial, in which we stated, that we had discovered pozzolane of an inferior quality on the canal of the Black Sea, on the island of Princes, and in various other islands in the Archipelago; and pozzolane of a very superior quality, at least equal to that of Italy, in the island of Santorino. The memorial was terminated by some details on the manner of employing each of these sorts.

The ministers of the Porte, on receiving this memorial, told the dragoman, that the Armenians had asked sixty thousand piastres for this discovery, instead of thirty, which they had offered us; they added, they should never forget the services we had rendered them, and their gratitude would be boundleſs if we should be able to accomplish our promises. We had seen twice on this subject the Shilibé Effendi, and he had as often held out hopes that the Porte would acknowledge in a manner worthy of it, the very important discovery we had had the goodneſs to communicate to it.

We were, however, on the point of setting out for Persia; our preparations were already made, and we were looking out for a caravan to Diarbekir, when the Porte insisted on our going to the islands of Santorino, Milo, and Argentiere, and that we should send some bags of pozzolane, in order that some preliminary eſsays should be made of it. The government chartered a French veſsel, and gave us a chiaoux to accompany us, and to bring back the specimens. We were obliged to make for Metelino, in order to get from the captain Bashaw, who was then at anchor at that island, those firmans which were neceſsary for us.

The inhabitants of Santorino, alarmed at this discovery, and fearful lest the Ottoman government should cause this earth to be worked at their expence, and send Turkish officers to their island, aſsembled together, as well to execute the orders of the Grand Signior, as to consider on some means of parrying the stroke which menaced them. They thought the best thing they could do, would be to send some of the principal

persons to the Latin bishop, with whom we were lodged, to offer us a present if we would tell the Porte we had not made any discovery in their island. We rejected the offers of these men, and sent off several bags of pozzolane of an excellent quality, which is very abundant, and easily worked. We relied entirely on citizen Verninac for the indemnity which had been promised us, and which we thought we had deserved by the importance of the discovery, by our having refused the offers of the Armenians, and by the pains, dangers, and delays, which this caused us.

The island of Metelino, almost entirely volcanic, is remarkable for its great fertility, its vast harbours, and for its hot mineral waters. Argentiere, known formerly under the name of Cimolus, is wholly volcanic. We observed with satisfaction that the Cimolean earth, which it furnishes in abundance, is but a slow and gradual decomposition of porphyry, caused by subterranean fires. I bring with me specimens of the different stages this earth paſses through. This observation will interest, without doubt, mineralogists, and will explain the origin of a substance hitherto so little known. The island of Milo is also wholly volcanic. It presents an immense port, on the shores of which there gushes out a spring of hot alum water; there is a grotto very hot, in which feather alum is formed; a volcano now burning, and a prodigious quantity of catacombs.

The island of Santorino is remarkable for the changes which a volcano has there operated, by the sinking of the greater part of the isle, which has thereby created a harbour of two leagues extent, from the bottom of

which three islands have arisen at well known periods. The rents of the earth caused by this sinking, which was almost circular in one part of the island, shew different beds of volcanic matter, among which are seen various pozzolanes. That which we sent to Constantinople, and of which I have specimens, may one day be useful in those marine constructions which the French will doubtleſs think neceſsary to be made in Egypt, when they shall be more solidly established there.

We touched for the second time at Rhodes, from thence we came to Barut, and then went to Seide, with the intention to proceed to Damascus, to take advantage of a caravan for Bagdad, as they had given us hopes of; but the caravan had set out a long time before, which obliged us to return back, and follow the route to Aleppo. We were unwilling to quit the shores of Syria, without paying to Tyre that tribute of admiration which such a town so justly deserves.

As the road from Latachia to Aleppo is never safe, we waited some days the departure of a caravan; during which time we sent to the national garden of plants a fifth box of seeds, which we had collected in the islands we had visited, and on the coasts of Syria.

On our arrival at Aleppo we occupied ourselves in observing the situation of the French in this town. We collected ideas as well concerning the commerce of the Europeans as of that of the natives, and sent to citizen Verninac a memorial on this subject. We made many observations in natural-history, and concerning the earth; we procured different sorts of birds, and some quadrupeds; after which we set off, towards

the end of winter, with a caravan. We paſsed by Orfa, Merdin, Niſsibis, and Mosul, and we arrived at Bagdad without any accident.

This journey was very interesting; for, independent of the great quantity of objects we collected, of observations we had cause in making, we were astonished to see a country extremely fertile, which, however, was almost quite deserted, often volcanic, and offering at every step traces of ancient towns. We croſsed the Euphrates and Tigris on bad wooden boats, and two rivers which flow from the Curdistan, on boats formed by a collection of blown-up skins. I shall enter into a fuller detail of this simple means of croſsing rivers, because it may be usefully employed in Europe, on account of the facility and cheapneſs of the transport of a great number of skins.

[*To be concluded in our next.*]

Viator's description of Edinburgh concluded.

THOUGH the *old*-town of Edinburgh claimed Viator's first and most particular attention, the *new*-town, as it is there called, comes in for its share of notice also: but, as this has been so often enlarged upon by travellers for some years past, we shall only briefly specify a few particulars.

Viator, like other travellers, takes notice of the beauty of the scite [a low ridge running nearly parallel to that of the old-town for the best part of a mile, having a gentle declivity towards each side along its whole length] the regularity of the plan [three parallel streets, croſsed by others at right angles] the spaciousneſs of its streets [the south and north streets being built upon

one side only, and thus left open to a very spacious prospect on either hand. The middle street, 116 feet wide between the houses, about two furlongs in length, having a square at each end of 500 feet of a scite] the neat uniformity of its buildings, and the pleasing hue of the stone of which they are composed; but above all, the superlative beauty of the prospects from the streets and the apartments of most of the houses. This last particular seems to have affected our traveller in no common degree; and he talks of the views from Queen Street in particular [the North Street, overlooking the Frith of Forth, &c.] with a rapturous enthusiasm that we would quote for the satisfaction of our readers, had we not found that he had afterwards reason to give a decided preference to another view of the same objects nearly from the Calton-hill. After a deliberative survey of the whole, he concludes his remarks on this part of the town with the following observations.

"I had heard much of the new town of Edinburgh before I visited it; but I confeſs I found the idea I had conceived of it to be extremely unlike to that which the sight of the objects themselves impreſsed. Many times had I heard a parallel to be attempted to be drawn between it and Bath; nothing, however, seems to me so incongruous as the idea of such a parallel. In both, it is true, the houses are built of free-stone, worked by the chiſsel: in both, the houses are constructed in a style of superior elegance: from both you have extensive views over the adjacent country, which is in both cases diversified by mountains and vallies. In these particulars they correspond; but in all others,

to my apprehension, they are totally dissimilar. In Bath the streets are irregular, and the communication between one elegant part of the town and another interrupted by narrow streets and lanes with short turnings, that almost baffle the attempts of the stranger to find out his way. In Edinburgh all is open, the streets clear, and the plan so regular, that a blind man with his staff might find out his way without difficulty to any individual house were he once directed to it. In Bath, the surface of the ground is so uneven, that the passage from place to place is so much up and down hill as to be at all times difficult, in some cases extremely dangerous by any mode of conveyance that can be devised; at Edinburgh, the access from one place to another is always easy, and in the highest degree commodious to every house, whether in a carriage or otherwise. In Bath, the houses are towered one above the other to an immense altitude, forming many successive stages, the higher commanding an extensive view over those below in a great number of gradations. In the new-town of Edinburgh, properly so called, the houses are so nearly on a level that nothing of this kind is perceived; although in some of the suburbs that are now building, towards Leith, there is indeed in one place somewhat of a similar appearance. In Bath, there is perceptibly a marked predilection for the circular sweep in the buildings; the straight line universally prevails in the direction of the streets of Edinburgh. The stone of Bath is of a pure white that dazzles the eye, somewhat resembling chalk. In Edinburgh the stone is of two sorts, both of them of a graver cast, the white in the one verging

towards the blue, and that of the other towards the brown. In Bath the buildings are slight walls, very thin, and a tendency to finery in exterior decorations is perceptible, the colonnade being there a favourite ornament. In Edinburgh the style of building is plainer; the colonnade is seldom seen; and the taste that there prevails of rough chiſseling the stone, which I have seldom seen any where else, takes off from the plaster-like look, and gives an appearance of much greater firmneſs and stability. The walls too are universally firm and maſsy. From these peculiarities the view of Bath, as you approach it from every side, exhibits many detached maſses of buildings that are seemingly unconnected with each other: that of the new-town of Edinburgh, wherever it can be seen unconnected with the old-town, is one large ponderous uniform maſs, cemented, as it were, together by indiſsoluble bands. Indeed, to my taste, the great uniformity in the height of the houses there, no house being permitted by law to exceed three stories, gives a heavy sameneſs of look to the whole which you would not expect when the separate parts are considered. Yet, on the whole, I cannot help agreeing with the Roman architect, whose words are often here quoted, in thinking, that, take it all in all, the new-town of Edinburgh is the finest town I have hitherto seen—the architect said, in Europe, through which he had travelled; for although, said he, there are doubtleſs finer palaces in Italy than any thing it can boast; yet these are so much blended there with meaner buildings, as greatly to hurt the general appearance of the whole; a palace, whose marble columns rise proudly eminent in majestic statelineſs,

being often contiguous to a ruined smith's shop, or a pigs-stye; whereas here, every house vies with another in neatneſs and propriety: and, as each differs from the other in some leſser particulars, according to the taste of the owner, opinions are often divided as to which of them ought to be entitled to pre-eminence."

Our traveller makes a few remarks on the style of the architecture of some of the public buildings, which, though they discover a correct taste, and a due acquaintance with the fine arts, we must omit. His observations on the Register Office being of a different cast, we shall beg leave to transcribe.

"This maſsy pile of building, says he, is appropriated to one of the most useful purposes that can be conceived; and it is much to be lamented that nothing of the same sort is established in England; for many are the benefits that would result from it. Before, landed property of any kind in this country can be transferred from one owner to another, the transaction is invalid, as I was told, until the deed of transfer be registered in a public register kept for that purpose: and in this building, which is so constructed that it cannot be consumed by fire, the whole of these registers are preserved: and what is still of greater consequence, no mortgage upon landed property can be of any avail until the mortgage be registered in the same office; so that by examining the records, which can be done for a small sum of money, any man who is to lend money upon mortgage can know whether any previous mortgage is in force respecting that land, and the amount of it, so that it is the lender's own fault if he ever runs the smallest risk of losing his

money. The consequence of this perfect certainty is, that men of landed property in Scotland can get money upon mortgage much more readily, and on easier terms, than those in England; by which means proprietors of land there find no difficulty in apportioning their substance among younger children in what manner they please, without the risk of law-suits, or other ruinous obstructions in the way. In one county of England, and a part of two others, I believe that a similar institution exists: but no such thing is known in any other part of that kingdom; which is often a source of much family distress to honest landholders, of occasional loss of property to others, and a temptation to frauds, by the insidious part of the community, that tends to derange the economy of the state. Why then, it may be asked, is not this institution extended over the whole of the kingdom? I do not myself pretend to answer this question, because it requires a wider acquaintance with the chicaneries of legislation than I as yet possess; but it is easy to see that the only objection to this that is usually held out to the public as the cause of it, is but a pretext, and that there must be in this something more than meets the eye, though what that is, I must leave others who are better read than I am in the machinations of mankind to decypher.

"It is usually said, that land owners universally oppose this measure, because it would lay open to the public the state of their finances. In matters of this sort I consider experience as better than any sort of reasoning: and, as it is well known that the landholders in Scotland are at least as anxious to conceal

the state of their private debts, and as desirous of figuring away, as those of England, to the best advantage, had this consideration been experienced as an evil, it must have been complained of by them as such. The truth is, they experience it to be quite the reverse. When a man in any part of the kingdom feels himself reduced to the neceſsity of borrowing money upon mortgage, this circumstance never fails to transpire by one means or other; and it is twenty to one that the amount of such mortgages is greatly magnified. One calls it a thousand pounds; another states it to be two: as it paſses from one hand to another it magnifies like a snow-ball, and where there is no means of detection or correcting erroneous statements, the debts of an unfortunate person under this predicament will be magnified to twenty times their real amount. In vain does the unfortunate sufferer, under these circumstances, try to invalidate these reports, by stating the real truth. His representation of things is disregarded; and, as no means remain for establishing the truth beyond a poſsibility of doubt, the report is believed, and he in vain endeavours to obtain a temporary supply to relieve some accidental distreſs, though he poſseſses the means of granting the most ample security. No one will enter into the investigation; all are unwilling to give a harsh answer to his application, and therefore every one declares at once their good wishes, and regret at their inability to follow their inclination in respect to this particular. Where a register exists, no such tantalising can be experienced. An agent who is empowered to lend money is no sooner applied to for that purpose, than he at once,

as words of course, requires a sight of an attested copy of a search of the register of mortgages for such an estate, which is always provided for that purpose. After this no misrepresentation can pafs current. The truth is exactly known, and the parties are at liberty to act as their judgment shall direct. It is a fair mercantile transaction, where doubt is removed, and friendship is out of the question. The borrower considers himself as under no obligation to the lender, and matters go on in the ordinary course of businefs. In fact, it is found that no person but lenders of money feel the smallest inclination to pry into these matters; and if others did so, the expence of searching the register is enough to prevent people from doing so for the purpose of satisfying a mere idle curiosity. Even curiosity itself is blunted from the certainty that it can be satisfied whenever it pleases; and thus it is that the situation of men's private affairs in Scotland, and in Middlesex, and one of the ridings in Yorkshire, where a register for mortgages is established by law, is lefs the subject of private speculation than in other parts of England. From all these considerations I cannot help viewing it as one of the most useful political regulations I know, and therefore I most heartily wish it were universally adopted over the whole kingdom."

A traveller, whose mind was affected by considerations of this cast, could not examine the capital of a country which, for so long a period, held a distinguished rank among nations as an independent kingdom, and whose constitution of government so much resembled our own, without taking a retrospective view of the ancient state of its government; especially

in the executive departments of it, compared with the present. In regard to legislation, though the seat of power be removed, and the mode of procedure somewhat altered, he has no hesitation in saying that in this respect Scotland has been much benefited by the change; for though some things might doubtlefs be altered for the better, yet he thinks there can be no doubt that the liberties of the subject and the general tranquillity are much better secured under the forms of the British, than they ever could have been under those that had been established in the Scottish parliament. We regret that we cannot follow our correspondent in his interesting observations on this head. He visited the Parliament-house, which he considers as a beautiful vestige of the abilities of our forefathers in the mechanical department of the fine arts; for, though it be of smaller dimensions than Westminster-hall, he thinks it superior in elegance and splendour. He takes a slight view of the present executive department of government in this kingdom, in as far as respects the administration of justice; and here also, unlefs it be the court of tythes, here called the court of *teinds*, he is inclined to give the preference to that part of the country of which he is a native. But in respect to the court of tythes, he shows with great force of reasoning the manifold advantages that Scotland derives from the modifications it has been subjected to since the reformation, and sincerely regrets that nothing of the same sort has ever yet been thought applicable to England. He also glances at some other beneficial changes in its political situation that Scotland has derived from the severe convulsions to which

it was subjected at the reformation. It is our opinion, that if the author would digest this article anew with greater care, and enlarge upon some heads that are slightly glanced at, it might be made a very interesting publication by itself.

After surveying the whole of the Parliament-house, that stands above the level of the street, he expreſses his surprise at being desired to walk down a dark turnpike stair which was lighted by the feeble glimmering of a lamp that was scarcely distinguishable as they entered from the sunshine, to visit the advocates library. He says, he felt a wish to be excused from going through this part of the etiquette, as he conceived it to be, but, in compliance with the request of his guide, he followed him with caution; but was surprised at being introduced into a suite of apartments, which, if not elegant, are at least spacious, and by no means ill lighted, from windows that have a free open area before them on the back part, which overlook the roofs of houses below them still on that side. These apartments are filled with a choice and numerous collection of books, of which the printed catalogue, consisting of several volumes in folio, besides several other volumes in MS. not yet ready for the preſs, lie upon a table open to the inspection of all visitors; with the librarian and aſsistant in waiting, to bring any book that shall be wanted for the purpose of being consulted, or making extracts from them if neceſsary. There was something so pleasing in this kind of surprise, and the politeneſs and regularity here observed were so agreeable, that he took pains to inform himself of the origin of this institution, and the rules esta-

blished for the management of its concerns, his account of which we shall present the reader in his own words.

"About the beginning of the last century, a person named Duncan Forbes was President of the Court of Sefsion (the supreme court of judicature in Scotland) who was a man of great stretch of mind and active energies. He had often in his younger days felt the inconvenience that resulted, to students of the law especially, from the want of books; many of which that are of great use for occasional consultation, are too expensive, as well as too difficult to be found, to be proper for a private library. He, therefore, in conjunction with a few others of similar dispositions with himself, devised the plan of the present library. They began by giving a donation of all the books they severally poſseſsed, that they thought suitable for the purpose, and establishing a fund for its future support. The Faculty of Advocates, as it is here called, that is, counsellors at law, is a numerous and respectable body of men; most gentlemen of landed property in that kingdom, pursuing that line of study, though many of them do not afterwards follow it as a buſineſs. As none are admitted into this body until they have undergone a serious examination and been approved of, the being admitted into that rank is accounted an honourable distinction, and a proof that the person who enjoys it has obtained, at least, a liberal education. Of course there are many candidates for this honour; it was therefore decreed by the Faculty, that every person, on his admiſsion into that claſs, should pay a sum, I believe a hundred pounds, to be applied to the sup-

port of the library; in consequence of which, each member is entitled to borrow what books he shall incline from the library, on granting a receipt for the same, which implies that the person so borrowing it must return it to the library on or before a certain day each year, when a complete revisal of the whole must be made by a set of inspectors appointed for that purpose. The amount of the monies thus arising, has been found on an average of years, sufficient, after paying the librarian and an asitant, and all other expences, to enable the trustees, as I was told, to purchase books to the amount of five hundred pounds each year. A committee of five gentlemen is appointed annually from among the members, to act as trustees for the management of the library, who are authorised and required to employ the whole, after deducting necesary expences, in purchasing books, in the choice of which they are left without controul. This I conceive to be one of the most beautiful devices I have ever heard of for choosing a proper library of books; for as none of these trustees, according to their rules, can be continued for more than one year at a time, it is almost imposible that books in any one department of science can be long neglected; for, among the changes that are thus ever succeeding each other, some individual will be found who has a taste for every branch of science, who will then take care to supply its deficiences in that line; and no one can be continued so long as to give him an opportunity of overloading it in his favourite department. As the library has been now continued under this wise management for above one hundred years, and as few

books that find acceſs there can be alienated, and as gentlemen who find themselves poſseſsed of rare and valuable books, are forward in giving them in presents to an institution where they can be of much greater public benefit than they ever could be of in a private collection, it is easy to conceive that it must soon become a most excellent collection. Indeed, it is at this moment, as I conceive, the very best general collection of books in this kingdom; and in a century more, should no general calamity derange the state of national affairs, it must become of infinitely greater value; for there is here a permanency in the choosing of good books that can scarcely be found in any other institution that I have heard of.

"What chiefly constitutes the value of this collection is, that there is a constant acceſsion of books to a great amount every year, so that the collection is not only good for one particular period, like that of the Bodleian library at Oxford, and many other collections of books that have been bequeathed by learned and liberal men to the public in England, but it must continue to augment in goodneſs at every other future period, by the acceſsion of all good books that are on sale at the time, so that it never becomes antiquated or uninteresting, as these of neceſsity must do, and thus come to be of use only, comparatively speaking, to a very small number of readers. Justly then ought this collection to be held dear by the inhabitants of this metropolis; for, while it exists, it will give a decided advantage to those literary characters who reside here over those that live perhaps any where else on the globe.

"What should render this library still more dear to

these people, is the extreme liberality with respect to the public that has always prevailed in regard to its management, so that it may be said to be at all times accesible by every individual. No questions are asked at any person in a decent dress, who behaves in a becoming manner when he comes into the reading-room. If he turns up the catalogue, and calls for any number in it, the book is immediately brought to him, if it be in at the time; and he may, if he pleases, sit down at a desk and read, or make extracts from it, during the whole time that the library is open (which is from ten till two) and he may return as often as he pleases. No person, it is true, unless those of *the Faculty*, is permitted to carry any book away; but as no literary person can live there without being acquainted with some of the Faculty, it is easy to get them to grant a receipt for any book that is wanted, when they are satisfied that it will be properly returned. In this way, all who have a turn for reading may be benefited by it, without either trouble or expence. When a literary person who lives at a distance, and is engaged in any special investigation, shall have particular use for any book in that collection, he may, upon particular application for an individual book in that collection, obtain it, upon complying with certain forms that have been devised for that purpose.

"It was intended that this library should have been transferred to the Register Office, with a view to guard against accidents by fire; but when they came to consider the numerous inconveniencies that would arise from that removal, in regard to the consulting books by council on a sudden emergency respecting

certain facts or opinions, that measure was for the present postponed. In the mean while, it is, I believe, in agitation, to make some neceſsary additions contiguous to its present scite, and to have the whole made fire-proof. Every person who considers the value of that depot, and the risk it at present runs on that score, must be anxious for the fulfilment of that plan, and therefore ought to deprecate all unneceſsary expence to be incurred on that account; for this is unfortunately a circumstance that has frustrated many of the most useful enterprises that have been attempted in Scotland."

We must not follow our traveller in his remarks on St. Giles's church, and the improvements of which he thinks it susceptible, in order that we may be the better able to attend to some of his other more interesting speculations.

It will be easily conceived that the state of the University would not escape the notice of a person who seems to be so desirous of becoming acquainted with every institution that promises to have an influence on the morals and manners, and general happineſs of the people. Viator has accordingly bestowed a due degree of attention to this important article.

"To one, he says, who has visited Oxford or Cambridge, and has heard of the celebrity of the University of Edinburgh, few things can be conceived that correspond leſs with the ideas he has naturally formed of it than the situation of that University. An abortive attempt, it is true, is there exhibited to erect a superb public building for the purposes of an university, which has been stopped for many years for want of

funds to carry it on, not only before it was half completed, but before the very foundations of the greatest part of it have been laid. This exhibits a specimen of the gigantic ideas of men when they contemplate some of the public structures of antiquity, and wish to vie with them in the fine arts without taking into the account all the circumstances of the case. The truth is, that the University of Edinburgh arose from a concurrence of accidental circumstances, and has, from the same causes, attained its eminence as a literary school, almost without patronage or public support of any kind. Its pecuniary funds have been at all times lower than, perhaps, any other university in Europe; and it will, perhaps, be found, that its celebrity originated from that very source. Be this as it may, it is certain that from that cause the teaching rooms of the lecturers have been always remarked for their uncommon meanneſs almost beyond all others. It is to this circumstance too, that we must ascribe the total want of every thing that bears a resemblance to that monastic system of government which prevails in most other universities. The profeſsors enjoy scarcely any salaries, some of the most eminent among them drawing only on that score, as I was aſsured, about thirty pounds a year; few of them have houses appropriated to the institution. They live in the town, and, for the most part, follow the buſineſs of a physician or divine, and only resort to their lecturing rooms at the hours appointed to meet their students. The students, too, enjoy an equal degree of freedom as the profeſsors; they lodge where they can among the inhabitants of the place: they are not distinguished by any particular

badge or dreſs, nor are any farther under the controul of the profeſsors than a sense of their own interest leads them to follow. They attend the lectures when they will, and when they please they may absent themselves without being liable to any severe reprehension on that account. In short, having once paid the price of a ticket of admiſsion for one year (three guineas) they are entitled to be admitted to a course of lectures for one season, which lasts for six months, usually five days in the week, each lecture being for the space of one hour; so that it is not for form's sake only that they attend here, but for serious and deliberate study.

"There is no particular course of studies here prescribed, farther than respects languages; the profeſsors are, in this respect, totally independent of each other, and the students are at liberty to attend any one they shall incline. Thus, it happens, that a profeſsor who has great celebrity, will sometimes make a claſs amount to three or four hundred where his predeceſsor in the same chair had not above fifteen or twenty. This is a strong stimulus to exertion on his part: nor is it worth the while of a man of inferior talents, but who may have powerful connections, to solicit a profeſsor's chair in this university; for here he must live neglected and in want. Such are the principal causes of the celebrity of this university: nor can there be any doubt that if its pecuniary funds were to be greatly augmented, the same want of literary ardour would be felt here as in most other seminaries of *learning*; if, indeed, the study of science be entitled to that name. From these circumstances also originates the peculiarity alluded to at the beginning of this article, that

there are few objects to be met in the streets, or public places, or private dwellings, that serve to put you in mind of an university. The students mingle with the mafs of the inhabitants, so that although their total number may exceed a thousand, you are not sensible of one being there unlefs when they are going out or into the college itself.

"There is also a very good library belonging to this university, the funds for its support arising from a small fee paid by each student on his matriculation, or entry to the university. This library is appropriated entirely to the use of the profefsors, and to the students, who may carry home any book in it they choose, upon depositing in the hands of the librarian the price of such book, this money being returned when the book is replaced in the library in good condition. This is a simple and efficacious expedient to prevent the lofs of books, which might be succefsfully adopted on many other occasions."

Our correspondent's time was so wholly occupied on these and similar inquiries while he staid in Edinburgh, that it was with great difficulty he could find leisure to take a view from the Calton-hill before he left that place. "I should certainly, says he, have shifted this load from my shoulders, by alledging as an excuse to myself that I had already seen so many of the objects that must enter into the view from thence, that I could form a very adequate notion of the nature of the prospects, had it not been for the importunity of a friend, who urged me so strongly not to go away without walking round that hill, that

I could not resist it, and I now consider myself as much indebted to him for that kindneſs.

"It was evening before I could accomplish this task; the sun had declined considerably, though it was still about an hour above the horizon when we set out on this excursion. Tired as I was with inceſsant walking throughout the whole day, I found it was an arduous task to climb the steep ascent, it being extremely hot, the sun beaming full upon us from the north-west as we mounted a narrow winding lane between two rows of houses, which rose like steps of stairs above one another on either hand; at length we got beyond the line of houses, and felt a little refreshed by a small breeze, which somewhat revived our spirits, and made us push forward till we reached the level of the walk; we found there a rustic resting place, which was extremely acceptable. From this spot the eye instinctively ranged over a vast extent of country, whose features exhibited more of boldneſs, conjoined with amenity, than any thing I had ever yet beheld. The tops of the double range of houses we had just paſsed were now seen, as it were, under our feet. The Register Office, and the high buildings adjoining to it, rose bold in front, with the walk of Leith, now crowded with paſsengers, male and female, in the fullest splendour of dreſs, mellowed by the yellowish tints of the evening sky, and enlivened by the sweetest reflexes from buildings and other objects, contrasted by the rich verdure of the vale below, operated like a charm that was infinitely soothing. A Mahometan might have said that these were the *Houris* of paradise sporting in the wanton air. To the westward, by the bot-

tom of the castle, was seen a rich vale waving with luxuriant crops of corn, intermixed with verdant fields, and trees, and cottages, and shining villas of wealthy citizens, bounded at no great distance on the right by a bolder hill; the Forth, here a spacious river, winding behind it, with hills on hills rising beyond, till they were at length lost in the luminous haze that now obscured them by its brightneſs. I was told, that by the morning light, the hills beyond Stirling (above thirty miles distance) could be distinctly seen; but the objects were now so indefinite, that fancy could form a fairy picture to itself that might out-rival the splendour of eastern magnificence.

"The transition from the western view to that on the north was easy and natural. The farthest hills, now nearer, rose with a bolder prominence, which, in a graver tone of colouring, served to relieve the brightneſs of the former scene. The Forth here spread wide, interspersed with islands, and enlivened by fishing boats, finely bounding the variegated champaign that stretched from the base of the mountain for several miles. Proceeding onwards upon a level walk eastward that turned in a circular form continually to the right, on which side the view was ever bounded by the rising hill, fresh objects opened on the eye at every step. The town of Leith, though a mile distant, appears almost beneath us. The island called Inch Keith before it, seems there to narrow the Frith, and forms a safe and commodious roadstead for numerous ships; many are now at anchor, some of them ships of war of considerable size; and various veſsels of leſs burden are plying about in all directions, so as to give

great life to the scene. The rising ground of Fife beyond it, chequered by various coloured fields, and undulated by hills of diversified forms, seem to rejoice in the parting smiles of the sun; while the Grampian mountains far behind are scarcely seen to mark a trace on the faint horizon. Onward as we move, the Forth expands itself into an ocean; no object marks its distant entrance except the isle of May, which seems a doubtful bank: but bold upon the right the Bafs, a perpendicular rock that rises in the sea with its flat top, finely contrasts the easier conic swell of north Berwick Law; the bay of Inveresk, spreading wide within land, is now spotted with white sails in various points of view. Onward a few steps, and the hill of Arthur's seat comes plump upon the eye, and intercepts the view. His bold and rugged rocks form a striking contrast to the smooth vale below; the abbey of Holyrood-house, and its ruined church, standing between, almost beneath your feet. Moving onward the eye still struggles in vain to look forward, till it reaches the perpendicular front of Salisbury rocks, beyond which it stretches far into an open country to the south, without almost noticing the Cannongate immediately under feet. Soon is the distant view contracted by the bolder rise of the Pentland hills, which range to the westward in many a varying form till they are lost in the west, forming the southern boundary of an extensive vale beyond the castle, which, though high when seen from other points of view, now sinks below the horizon.

" This sketch will serve to convey but a very faint idea indeed of a few of the most prominent objects

that serve to diversify the features of the ever-varying landscape that presents itself in going along this enchanting walk. The walk itself has been cut out with more taste, than labour or expence, upon the side of the hill, merely for the purpose of obtaining a level path about twelve feet broad, which follows the contour of the hill in its various prominencies and depreſsions, without any other rule than to preserve still its horizontal level, till nearly it completes the circle; being about a mile, as I conceive it, in length. Those persons who are old enough to have seen the first Panorama that was exhibited in Leicester-fields, will perhaps recollect something of the prospect; though the artist who executed it, being then but a novice in that profeſsion, was far from being able, as I have been told, to do any thing like that justice to the scene, which is so conspicuous in those that are there exhibited in the present day. I should have had reason ever to regret it, had my indolence prevented me from seeing this incomparable view; nor should I have begrudged the labour had it cost me a month, instead of a couple of hours, to have accomplished it. Yet such is human indolence, that many persons here, who have it in their power to see this delightful prospect any day they please, have never seen it. Fashion, not taste, is all-powerful in matters of recreation. This walk is not now in vogue. A philosopher might loiter away in it a whole day, without meeting with any other objects to disturb him than a few children, and some sheep that eat up the spontaneous productions of the hill. The evening now dropt down in calm serenity, and a refreshing coolneſs invited me to saunter

there for some time to indulge the reflections that naturally arose on the occasion; and it was with reluctance I could prevail on myself to retire, in order to prepare myself to pursue my excursion in proper time the next day."

Notices of an experimental Farm, by the Duke of Bedford.

When gentlemen of rank and fortune, despising the little arts that are so unavoidable in an attempt to exalt one political party of men in the state, and depreciate another, direct their energies with sober seriousnefs to encourage those improvements which tend to augment the welfare of individuals, and promote the prosperity of their country, they are in the train of ennobling their own character, of reflecting lustre upon the line of ancestors from whom they are descended, of acquiring an honourable distinction among their cotemporaries, and a reputation that will be dear to distant ages. How strong ought these inducements to be to a conduct of this kind! Yet the stimulations of vanity in youthful minds are so strong, the influence of example so powerful, and the desire of immediate distinction so alluring, that few can be permitted to think seriously of the importance of these distinctions at an early period of life; and, before they have attained the age when reason ought to be matured by experience, they too often find themselves so deeply engaged in that vortex into which they have been heedlefsly drawn, that the apparent impofsibility of ever being disengaged from it deprives them of the power of making even an effort to free themselves from it, till

after struggling thus for a time, continually tormenting and tormented, they at last are swallowed up, and buried in eternal oblivion, if they escape the distinction of being remembered with detestation.

One man of considerable rank and fortune in this country had the judgment at a very early period of life to choose the better part, and has thus been suffered to enjoy an unimbittered gratification for the present, while he prepares for himself a niche in the temple of fame that will not be soon obliterated. Sir Joseph Banks will here present himself to the mind of every person who is fond of literary pursuits; for they know that at that age in which most men of rank are engaged in the giddy whirl of varied amusement, he digested a plan for promoting the knowledge of a particular department of science that does honour alike to his understanding and his dispositions; and with a liberality that has no equal, that I know of, in this country, and a firmneſs that admits of no abatement, has steadily pursued it for such a number of years, as leaves no regret in the minds of those who contemplate it, but that it must, in as far as respects his own personal exertions, but too soon come to a termination.

In the natural arrangements of the body politic, there are certain duties that fall to the share of every different claſs of men, into which they neceſsarily separate, that can only be properly discharged by that claſs to whose department they are suited. Every thing goes on in due order when this is done; but when those of one claſs take upon themselves to encroach upon the province of another, the whole is thrown into disorder; and fooleries, inconsistencies, and distreſs, uni-

versally prevail. The lower classes of the people are calculated to labour with their hands, and thus to provide their portion for the welfare of the community. To those of higher rank leisure is afforded for cultivating the faculties of the mind in a greater or lesser degree, according to their means and faculties; to these belong the departments in which activity, connected with skilful arrangements, are required; they direct the exertions of the inferior agents, and communicate activity to the whole machine. These, verging from the lower orders by imperceptible degrees, branch out into innumerable divisions, each having his views directed to a particular point only, upon which self-interest fixes it with invariable steadiness. Above these there are others who contemplate general arrangements, scientific attainments, and the fine arts. Among all these orders of men it becomes necessary that the attention of each individual should be steadily fixed by the prospect of benefiting his condition in one way or other, or he never can come near to the highest point of attainable perfection. Above these the higher orders rise, who, enjoying affluence, are above the line that leads to perfection in the inferior departments; so that this is unattainable by them, as it is equally vain in those in the lowest spheres to attempt to rival them in those pursuits that their superior means put within their reach. One of the principal duties that fall to the share of this class of people, is to furnish the funds on which the active energies of those of inferior wealth may be exerted; for, towards the perfecting of each department of industry, science, or arts, there are facts and materials wanting, on which ingenuity may

be exerted with advantage, that cannot be attained without an expence that far exceeds the reach of those in general who are best capable of making the proper use of them; without which ingenuity must be suffered to languish, and arts stop far short of the perfection they might be made to attain. It was this mode of reasoning, I have no doubt, that suggested to sir Joseph Banks the idea of that institution for the improvement of science that he has so happily adopted. To collect facts in the science of natural-history (which was the department to which he peculiarly confined his views), innumerable multitudes of persons must be employed in all parts of the world for a great length of time, and the discoveries that these individuals make can only be made known to others by means of many and expensive publications, which it is totally beyond the reach of those, who have most need of these aids to forward their exertions, to purchase. Sir Joseph, therefore, has appropriated a large proportion of a very ample fortune to the purchasing of all the books that are published on that science in every part of the world, which are deposited in his library, where they are open to the inspection at all times of every literary person who is properly recommended to him. In his library they may read and write at their ease, they being there furnished with every accommodation that can render their situation agreeable.

Influenced by similar considerations, I have no doubt the duke of Bedford, as I have been informed on the best authority, has set apart two extensive farms of considerable value, differently circumstanced, for the sole purpose of carrying on experiments in agriculture that

are neceſsary to ascertain doubtful facts that are wanted to direct into a proper channel the industrious exertions of the practical farmer, with a view to bring agriculture, as a practical art, to a still higher degree of perfection than it hath hitherto attained. This has been long a thing ardently wished for by every person who has made that department of buſineſs his particular study; and many attempts have been made to form such an institution by the means of voluntary subscription; all of which have proved unsucceſsful, chiefly from the difficulty there has always been found, first, to obtain funds sufficient to answer the purpose wanted; and, secondly, from the want of concord and unanimity for a sufficient length of time among such a numerous body of persons, whose intellectual powers are so different, and whose objects for uniting are so discordant, as to render it impoſsible for any operations to be so conducted as not to give disgust to many of the members, who withdraw themselves from it so soon as to bring it to an unsucceſsful termination. From the well known good sense, firmneſs, and steadineſs of character of the nobleman who has determined to carry into effect this measure, there is much greater reason to hope it will prove succeſsful than any other plan of the same sort that has ever hitherto been devised in this country. The person the duke has made choice of for superintending, arranging, and conducting these experiments (the Rev. Mr. Cartwright, who is well known for his talents and knowledge) must afford satisfactory evidence to the world that it is not an inconsiderate undertaking lightly conceived, that may be as lightly abandoned; but is the result of steady deliberation, and will be proceeded in, without wavering,

for such a length of time as to render it a truly useful institution.

I have not yet had an opportunity of being informed of the particular objects that are meant to be principally elucidated on this experimental farm; but there is reason to hope that it will be confined to some particular departments, which will be steadily pursued, as is the case with sir Joseph Banks's institution, and that it will not be suffered to take a desultory range over the whole field that presents itself. On the first plan much may be done, by introducing a spirit of accurate investigation into this science, which scarcely yet has begun to be adverted to even by individuals: but if the whole field is attempted to be opened up at once, it can only give room for superficial disquisitions, which lead to inaccurate or erroneous conclusions. If, upon the first plan, any one department shall be once clearly elucidated, it will serve so much to open the eyes of the public respecting the defects of others, as must excite a strong desire to carry the same degree of accuracy through the whole; and the reputation that the founder of the institution will thus justly acquire by it, will prove a strong stimulus to others to follow his example, by forming similar institutions on a smaller scale for particular departments. When I hear farther particulars, I shall take pleasure to communicate them to my readers, should my state of health, now upon the decline, permit me to continue these labours.

[*Notices to Correspondents necessarily omitted.*]

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